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ABSTRACT

The purpose of this investigation was to examine the effect of a reading management system, Accelerated Reader, on the norm referenced scores of selected second- through sixth-grade at-risk and not at-risk students over a three year period of time. This was to determine if there was any significant change in the scores between students who utilized Accelerated Reader, in addition to the basal reading program, and those who did not, on their norm curve equivalent reading, norm curve equivalent total change, reading scale, and total scale scores on the CTBS Terra Nova test. The population involved in the study included 141 students over a period of three years at two Title I suburban schools. These students were disaggregated into stratified groups (at-risk and not at-risk) of three cohorts of students who had taken the CTBS Terra Nova test for three consecutive years at the experimental and control Title I schools. The at-risk group at the control school (Beta) consisted of 31 students. The at-risk group at the experimental school (Alpha) consisted of 38 students. The not at-risk group at the control school consisted of 72 students. The study utilized a multivariate analysis of variance with the risk and not at-risk cohort groups as independent variables and the rate of changes, declines or improvements in each test (Read SS, Total SS, NCER, NCET), as dependent variables. Three null hypotheses were formulated to test for statistically significant changes between the cohorts. The researcher used a 2x3 analysis of variance approach to test for differences according to treatment condition. The study resulted in two statistically significant changes in reading and total scale scores, with the youngest cohort of second through fourth grade students showing the greatest improvement or gain. (Contains 168 references, 4 tables, and 4 figures of data.) (Author/RS)

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THE ROLE OF READING INSTRUCTION AND THE EFFECT OF A READING MANAGEMENT SYSTEM ON AT-RISK STUDENTS

Virgil N. Kambarian, Jr, B.S., M.S.

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A Digest Presented to the Faculty of the Graduate School of Saint Louis University in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

2001

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DIGEST

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The population involved in the study included 141 students over a period of three years at two Title I suburban schools. These students were disaggregated into stratified groups (at-risk and not at-risk) of three cohorts of students who had taken the CTBS Terra Nova test for three consecutive years at the experimental and control Title I schools. The at-risk group at the control school (Beta) consisted of thirty-one students. The at-risk group at the experimental school (Alpha) consisted of thirty-eight students. The not at-risk group at the control school consisted of seventy-two students.

The study utilized a multivariate analysis of variance with the risk and not at-risk cohort groups as independent variables and the rate of changes, declines or improvements in each test (Read SS, Total SS, NCER, NCET), as dependent variables. Three null hypotheses were formulated to test for statistically significant changes between the cohorts. The researcher used a 2x3 analysis of variance approach to test for differences according to

treatment condition. The study resulted in two statistically significant changes in reading and total scale scores, with the youngest cohort of second through fourth grade students showing the greatest improvement or gain.

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2001

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DEDICATION

For all their patience, understanding, and support during the long period of time that I worked on this project, I dedicate this to my loving wife, Lois Jean, and our children, Erik, Jim, and Kristin. I also dedicate this to our parents, Virgil, Anna Mae, Millie, and Ed, and a special thanks to my grandparents, Abraham and Herminie Kambarian, who were immigrants and raised me from a child. Their spirit is always with me. Thank God and thank you all!

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CHAPTER I

THE PROBLEM

Literacy, defined as the ability to read and write, has been steadily rising in the United States for the last one hundred years (Stedman & Kaestle, 1987). Even though basic literacy has been on the increase, the demands for literacy have been rising faster. Despite the fact that most Americans can read and write, many do not read and write well enough to handle the complex demands of our modern society (Krashen, 1993). This study examines why students are not meeting those demands and the different areas of literacy and reading ability that are affecting the problem.

Research indicates that the rise in literacy is not consistent for all students. The National Assessment of Educational Progress (NAEP) in its annual report on reading provided estimates of the percentage of children who are reading at a basic level or below. In 1998, fourth and eighth graders in central city schools had lower average reading scores than their counterparts in urban fringe/large town and rural/small town schools. In addition, this 1998 NAEP report also stated that those students (hereafter referred to as at-risk students) who were eligible for free or reduced lunch programs had lower than average reading scores when compared to students who were not eligible for the program (U. S. Department of Education, 1999).

Puma et al. (1997) confirmed that for students in schools with more than 75% of the students eligible for free or reduced lunch support (a measure of high poverty), the mean weighted reading comprehension scores for fourth grade

students in the fall semester was at the 44th percentile of the national norms, while the national sample score was at the 50th percentile. This report confirmed earlier reports of a connection between achievement and low income (Goodlad, 1984).

Many factors might account for a decline in percentages in reading for at-risk students. These factors could exist alone or be part of a system-wide problem. Some of the factors could include low expectations on the part of the faculty and administration, poorly trained teachers, and inadequate or out-of-date books and resources.

Low teacher expectations for at-risk students can result in lower performance in reading. Research has shown that teachers often refer students for special education because they believe some inherent problem or "pathology" is present. In other words, teachers believe instruction is not the culprit, but that the child inherently lacks the ability to learn (Allington, 1994; Klenk & Palincsar, 1996).

Richard Allington, (1994) in his book *The Schools We Have, the Schools We Need,* contended that because at-risk children begin school with few experiences with print, educators generally confuse the children's lack of experience with a lack of ability, and, as a result, lower their expectations of such children. Allington also stated that reading and writing occupy less than ten percent of the American school day, that schools are better at sorting children than supporting them, that children focus on remembering instead of evaluating, and that debates over curriculum ignore instructional interventions and environments.

Indeed, the most frequently used strategy to deal with at-risk students seems to be to retain them. Johns Hopkins University's Center for Research on the Education of Students Placed At-Risk reported that the literature on grade retention presents a consistent picture. Most students retained are males, minority students, students from lower socioeconomic homes, and students with disabilities and poor health conditions (Karweit, 1991a). By the end of elementary school a large number of students in a majority of urban school districts had been retained at least once (Gottfredson, 1988).

In addition, research by Karweit (1991b) has shown a significant correlation between dropouts and retention. Retained students are more likely to be male, younger than their classmates, from a lower socio-economic class, black or Hispanic, a behavior problem, and immature. She also reported that dropouts are five times more likely to have repeated a grade than high school graduates, and students who repeat two grades have nearly a 100% probability of dropping out of school. Indeed, Snow, Burns, and Griffin (1998) have found the following:

> Academic success, as defined by high school graduation, can be predicted with reasonable accuracy by knowing someone's reading skill at the end of grade three. A person who is not at least a modestly skilled reader by the end of third grade is quite unlikely to graduate from high school. Only a generation ago, this did not matter so much, because the long-term economic effects of not becoming a good reader and not graduating from high school were less severe. (p. 21)

Longitudinal studies have shown that disadvantaged third graders who have failed one or more grades and are reading below grade level are extremely unlikely to complete high school (Lloyd, 1978; Kelly, Veldman & McGuire, 1964).

Schwartz (1995) reported that nearly half of the disadvantaged students that are retained come from households on welfare, while a similar percentage of the prison population are dropouts. This dropout rate also translated into significant economic consequences. Schwartz's study showed that in 1992 high school dropouts earned slightly under $13,000 on average, about one third less than a high school graduate did. With respect to lifetime wages, the gap between dropouts and adults that are more educated is widening, as opportunities expand for higher skilled workers and disappear for the less skilled. Schwartz estimated the 1993 dropout pool would earn $212,000 less than high school graduates and $812,000 less than college graduates.

Despite empirical evidence against its use, educators in public schools tend to strongly recommend and use retention (Byrnes & Yamamoto, 1986). Public belief in the efficacy of retention also creates a powerful mandate for its use (Shepard & Smith, 1990). Failing students has a misleading, short-term positive effect on test scores mainly because the students are a year older. However, the long-term effect on student achievement is mostly negative (Jackson, 1975; Shepard & Smith, 1989).

The literature has shown that actual reading practice increased reading ability (Krashen, 1993; U.S. Department of Education, 1986) and that a lack of reading practice resulted in a decline in reading ability (Allington, 1977; Carbo, 1996; Krashen, 1993). Lack of actual reading time during the school day had a negative impact on reading development (Allington, 1994; Anderson, Heibert, Scott & Wilkerson, 1985).

This study was begun because the researcher decided that examining the various factors that affect achievement in reading for at-risk students was important. As a result, this study examined various reading instructional methods, reading practice, literature-based reading in the Accelerated Reader (AR) reading management system, and the role that motivation plays in reading achievement.

The focus of this study was to examine a reading management system, AR, which relies on practice and motivation and uses assessment instruments that allow for intervention, remediation, and enrichment in order to measure meaning and comprehension. This study examined the statistical significance of this program on reading achievement and the overall achievement of students at Alpha School and another Title I school, Beta, which did not use AR.

Background of Research

This study is about Alpha and Beta Elementary Schools, Title I, K-6 schools in the St. Louis metro-east Illinois area. Alpha School's student population consisted of approximately 300 students with 73% considered at-risk. Beta School's enrollment was approximately 450 students with 48% considered at risk (Illinois State Board of Education, 1999). The federal government has defined at-risk students as those students who receive free or reduced lunch support and are considered deprived economically. Alpha's reading scores were among the worst in the school district. Therefore, the Title I committee at Alpha School felt improving the reading performance of those students should be a priority.

In the fall of 1996, the Title I committee of Alpha School, which is made up of the principal and various teachers, began to consider possible causes for such

low reading scores. Was it instruction, a lack of adequate materials, inadequate curricula, socioeconomic factors, a combination of these factors, or something else not yet considered? The Title I committee, after researching some alternatives to supplement the district basal reading program, suggested the AR reading management system to the staff of Alpha School. The staff of Alpha School agreed to implement AR. At this point, the committee embarked upon researching this reading management system, as well as learning about factors that affect reading and instruction.

In an attempt to address the low reading scores and to determine any relationship between the scores and the amount of time spent in actual reading practice, the Title I committee adopted the AR system at Alpha School as a supplement to the basal reading curriculum. The Title I committee of Alpha School and the researcher (principal of Alpha School) soon learned that the AR reading instruction process and its various components are very complex. The researcher and the Title I committee also believed that success in school was dependent upon acquiring the most basic of all academic skills, reading skills.

Purpose of the Study

The purpose of this research was to evaluate whether the AR reading management system was effective (statistically significant) for at-risk students at selected Title I schools in a suburban setting with regard to their overall achievement in reading and in all academic areas (composite scores).

Interacting Variables

In this study, the independent variables were at-risk students using AR and at-risk and not-at-risk students not using AR as a supplement to reading instruction. The two groups were divided into three cohorts at an experimental and a control Title I school. The at-risk group at the control school (Beta) and the experimental school (Alpha) were both made up of cohort one (grades two, three, and four), cohort two (grades three, four, and five), and cohort three (grades four, five, and six). The not at-risk group was at the control school only. It contained the same three cohort groups as the experimental group. The dependent variable was the overall and reading achievement measured by scale score (SS), total SS, normal curve equivalency (NCE) reading, and NCE total scores as measured on the Comprehensive Test of Basic Skills (CTBS).

Statement of Hypothesis

The study investigated the effects of the relationship of a reading management system, AR, on the achievement of three cohorts of at-risk and not-at-risk second through sixth grade students. The study spanned a three-year period at two-selected Title I elementary schools in a suburban setting and looked at overall achievement in reading and other composite academic areas. These composite areas were reading/language arts, language mechanics, spelling, and mathematics and math computation. The main hypothesis tested as stated in the null form is:

Null Hypothesis 1 (Ho): There will be no statistically significant differences on scores between reading SS, total SS, NCE reading scores, and NCE total composite scores among students for the three cohort groups.

Other related hypotheses included in the investigation as stated in the null are:

Null Hypothesis 2 (Ho2): There will be no statistically significant differences on reading SS, total SS, NCE reading, and NCE total scores for the two comparison (experimental at-risk and control not at-risk) cohort groups.

Null Hypothesis 3 (Ho3): There will be no statistically significant interaction between the cohort and comparison group variables.

Limitations of the Study

This project was limited to two public Title I elementary schools in a St. Louis metro-east Illinois school district. The AR program, although begun in 1996-97 at Alpha School, had only recently been fully implemented beginning with the 1997-98 school year. It was not used at all at Beta School.

The study took into account neither individual differences in teacher experience with reading instruction, nor teacher motivation and expectations. The researcher did not consider teacher-initiated intervention strategies related to the district's basal reading series or other individual teacher directed programs targeted to improve student achievement in reading (aside from AR). In addition, the application of generalizations of this study to rural areas is also limited since the research was done in a predominantly urban area in the metro St. Louis megalopolis.

The size of the school was a limitation as Alpha School was the smallest school in the district with about 300 students. Beta School's population was approximately 450 students. No attempt was made to compare Alpha's reading

achievement scores with a school of comparable enrollment since there were none in the district. Research has shown that students in small schools perform better academically than those in large schools (Fowler & Walberg, 1991). The study was limited by the extent to which the CTBS was administered properly, to which reading scores on the CTBS norm-referenced test accurately measured reading and overall achievement, to which teachers involved in this study implemented the AR program properly, and by the differences in the poverty levels of the at-risk students. More than 50% of the at-risk population from the experimental school lived in a public housing project, coming from high poverty backgrounds.

Definitions

Alphabetic Principle: The idea that written words are composed of patterns of letters that represent the sounds (phonemes) of spoken words is known as the alphabetic principle (Snow et al., 1998).

Accelerated Reader (AR): AR is a system of computerized testing and record keeping with increased literature-based reading practice as its goal. The program operates on the theory that reading practice and teacher intervention lead to increased reading ability, especially among students at-risk (Paul, VanderZee, Rue, & Swanson, 1996).

Actual Reading: Actual reading includes any activity in which a student is processing words. It could include silent independent reading, being read to aloud, or paired reading, referred to in AR as Duolog reading (Institute for Academic Excellence, 1997).

At-Risk Students: Characteristics of at-risk students are low achievement, retention in grade, behavior problems, poor attendance, low socio-economic status, and attendance at schools with large numbers of poor students (Slavin, 1989).

Basal Reader: Basal readers are pre-planned, sequentially organized detailed materials and methods to teach developmental reading skills systematically (Britton, Lumpkin, & Britton, 1984; Ollila & Nurss, 1981).

Comprehensive Test of Basic Skills (CTBS): The CTBS is a standardized norm-referenced test administered to monitor individual student's year-to-year growth and to identify each student's strongest and weakest areas of achievement (Cizek, 1998).

Frustration Reading Level: "The frustration level is the level at which a child's reading breaks down, fluency disappears, word-recognition errors are numerous, comprehension is faulty, recall is sketchy, and signs of emotional tension and discomfort become evident" (Harris & Sipay, 1985, p.171).

Instructional Reading Level (IRL): "The instructional reading level is the highest level at which a child can do satisfactory reading provided he or she receives preparation and supervision from a teacher. Word recognition errors are not frequent and comprehension and recall are satisfactory" (Harris & Sipay, 1985, p. 171).

Literacy: Literacy is considered the ability to read and write at a designated level of proficiency. Literacy is more precisely defined as a technical capability to decode or reproduce written or printed signs, symbols, or letters combined into

words. Literacy is closely associated with the alphabet and its role in both written and oral communication (Graff, 2000).

Literature-Based Reading Instruction: Literature-based reading instruction is the use of children's literature to teach children to read by reading trade books as opposed to textbooks (Paul, 1996).

Metacognition: Metacognition refers to thoughts about thinking (cognition), for example, thinking about how to understand a passage (Snow et al., 1998).

Phonics: "The term phonics refers to instructional practices that emphasize how spellings are related to speech sounds in systematic ways" (Snow et al., 1998, p. 52).

Phonological Awareness: Phonological awareness is an awareness of the sounds of speech, called phonemes, of which there are 44 in our 26-letter alphabet. It includes an understanding that words can be divided into a sequence of phonemes that are distinct from their meaning (Snow et al., 1998).

Reading: The meaningful interpretation of printed or written verbal symbols is called reading (Harris & Sipay, 1985).

Reading Comprehension: Reading comprehension is a result of the interaction between the perception of graphic symbols that represent language and the reader's language skills, cognitive skills, and knowledge of the world (Harris & Sipay, 1985).

Standardized Test for the Assessment of Reading (STAR): STAR is a computer-generated test that measures an individual student's reading level within a few

minutes. It is used to insure students are within their zone of proximal development (ZPD) (Advantage Learning Systems, 1994).

Trade Books: Trade books are books published by booksellers instead of by textbook publishers and intended for distribution to the public (Morris, 1982).

Whole Language: Whole language is a method of teaching that asserts that students learn reading and writing through context and meaning by immersing them in literature (Goodman, K., Goodman, Y., & Hood, W., 1989).

Zone of Proximal Development (ZPD): The ZPD is the idea that cognitive skills and patterns of thinking are not primarily determined by innate factors. The ZPD is the difference between the child's capacity to solve problems on his own and his capacity to solve them with assistance. This is a key element in understanding how AR works with reading practice (Vygotsky, 1962).

CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of Chapter II is to review the literature, research, and theories related to reading instruction and how it relates to the AR program. Areas of study include reading practice as a supplement to traditional basal reading instruction along with the subjects of vocabulary, motivation, and cognitive processes, with an emphasis on at-risk students.

A review of the related literature resulted in the identification of eight trends in the current research. They include: (1) studies that focus on the historical nature of reading instruction; (2) studies that focus on the philosophical dichotomy of reading instruction; (3) studies that focus on the political controversies pertaining to reading instruction; (4) studies that analyze empirical reading instruction; (5) studies of contemporary reading instruction in relation to at-risk students; (6) studies that analyze reading instruction and the reading management system known as AR; (7) studies that focus on cognitive processes and literature-based reading; and (8) studies of the research done on AR.

Reading Instruction from a Historical Perspective

According to Smith, (1962) primitive reading instruction began with the use of gestures, hand signals, and sign language, and over the course of time man developed symbols to represent certain sounds. Curtis (1997) estimated the oldest writing to date from about 4000 B.C. The most ancient of these is an inscription

in Egyptian hieroglyphics that contained the letters N, S, and D, evidence that hieroglyphics were direct ancestors of our alphabet.

In *The Story of the Alphabet*, Clodd (1955) stated that as increasingly more sounds were used, a real need developed to select a number of symbols to describe certain sounds. As time went on these symbols were grouped to form syllables and finally complete words.

In *American Reading Instruction: Pre-Revolutionary Religious Influences*, Reutzel (1981) explained that American schools and early pedagogical practices evolved from our English ancestors and were very religious in nature. Colonial Americans imported most reading instructional materials from England because of a lack of printing presses in America.

Reutzel (1981) listed the horn book as the first piece of reading instructional material imported from England. Curtis (1997) said these horn books went to schoolboys (no girls were allowed in school) and were actually thin oak boards that looked like a paddle. They measured about 9 by 5 inches with the alphabet, usually the Lord's Prayer, and some numbers printed on them. Eventually more elaborate horn books became a means of displaying status and enabled students to learn to read even after the invention of the printing press.

The first book printed in America was a religious book called the Bay Psalm Book (Curtis, 1997). A number of early books such as the *Protestant Primer* written in 1685 and the *New England Primer* written in 1683 contained prose, crude pictures, some spelling rules, the alphabet, and some syllables for children.

During the colonial period, however, descriptions of methods for teaching reading were rare (Reutzel, 1981).

In his book, *New Discovery of the Old Art of Teaching School*, Hoole (1912) said that reading instruction began with teaching the letters of the alphabet in the horn book. Reutzel (1981) offered a quote from the writings of Hoole to emphasize this point.

> The usual way to begin a child when he is first brought to school is to teach him to know his letters in the Horn-book, where he is made to run over all the letters in the Alphabet or Christ-cross [*sic*] row both forwards and backwards, until he can tell any of them, which pointed at. (p. 21)

The students learned the syllabarium after they mastered the alphabet. To explain how a child learned to spell, Reutzel (1981) included a quote by Hoole (1912).

> The common way to teach a child to spell is after he knows the letters in the Alphabet, to initiate him into those few syllables, which consist of one vowel before a consonant, as ba, be, bi, bo, bu, etc., in the Horn Book, and thence to proceed with little and little to the bottom of the book, hearing him twice or thrice over till he can say his lesson and then putting him to a new one. (p. 21)

Reutzel (1981) stated as students mastered the primer, they began reading and memorizing the Bible and biblical passages. Oral reading was a family affair and a source of entertainment and recreation with the Bible usually being the only book in home libraries. Thus, from the 1700s to the mid 1800s, American children were taught to read through memorization of the alphabet with the Bible as the primary textbook.

The following chronology of reading events was published by the *Baltimore Sun* in a series of articles about reading instruction entitled "Reading by 9" and listed reading instruction as it has evolved to this day (Athans, 1997).

1783: Noah Webster publishes *The American Spelling Book* used for almost 100 years. Mid-1800s-early 1900s: *McGuffey Readers* prevail. Very phonics oriented. Inspired by Jeffersonian democratic ideals, some educators' say reading instruction should be "meaning based." Phonics comes under attack.
1930s: Look-say or whole word (not whole language) emerged, exemplified by Dick and Jane readers. Instruction emphasizes reading comprehension.
1940-1960s: Dick and Jane readers eventually grab 80 percent of the textbook market, helping teach 85 million children to read.
1955: *Why Johnny Can't Read*, by Rudolf Flesch, attacked look-say instruction. Urged a return to phonics. "We've thrown 3,500 years of civilization out the window," 1960s: Dick and Jane begin to fade, but "look-say" readers dominate into the 1970s.
1967: Jeanne S. Chall's *Learning to Read: The Great* Debate, endorses direct instruction in phonics.
1970s: Whole language emerges with intellectual roots in New Zealand, Europe, and North America. Phonics de-emphasized. Greater emphasis placed on the meaning of text.
1981: Twenty-six years after *Why Johnny Can't Read*, Rudolf Flesch publishes *Why Johnny Still Can't Read.*
1982: *The Read Aloud Handbook* by Jim Trelease is published. The bestseller places great emphasis on real literature.
1984: The federal commission on reading issues *Becoming A Nation of Readers*. "The issue is no longer, as it was several decades ago, whether children should be taught phonics," the commission said.
1987: All California schools convert to whole language.
1995: California's "ABC" laws require instructional materials to include "systematic, explicit phonics, spelling and basic computational skills." North Carolina and Ohio follow suit.
1995-1997: "Word Identification" programs in most Maryland school systems include phonics. (p. C1)

Reading Instruction from a Philosophical Perspective

Ediger (1995) stated there has been an on-going debate in the world of reading instruction between what he calls the measurably stated objectives philosophy of reading instruction and the idea centered curriculum reading instructional philosophy. Ediger said measurably stated objectives stress that reading should be divided into specific skills with precise components that require equally

precise objectives that are stressed in teaching and learning situations, in short a basal and phonics approach.

The idea-centered curriculum emphasized the self-selected reading of diverse trade books resulting in students sequencing their own learning, a type of whole language approach. Ediger (1995) believed that this is a more holistic approach, since the reader is taught to comprehend subject matter and appreciate literature rather than to acquire specific skills. Ediger concluded by saying that whatever method a teacher uses there is a need to recognize student's individual differences and make sure that reading instruction meets those needs.

Reading Instruction from a Political Perspective

It has been suggested by Flippo (1997) that the media and politicians have led people to believe that schools are not teaching children to read properly, laying the blame on whole-language instruction. Flippo stated that state legislatures have responded to this by mandating phonics instruction, deciding what materials that teachers should use, and de-emphasizing comprehension, comprehension strategies, and vocabulary knowledge.

"Reading wars" publicity has resulted in state mandates that are expedient and reactionary because they ignore the needs of children and rely on test results that are inappropriately interpreted. In a survey by the National Reading Conference (NRC), out of 34 states surveyed, 26 of them had proposed or enacted new legislation related to the teaching of reading. Most of the legislation emphasized phonics instruction and the retraining of teachers in a phonics-based curriculum (Flippo, 1999).

Most of the latest research related to reading instruction reflects this politically inspired shift in reading philosophy. The majority of studies focus on phonics, phonemic awareness, and skill instruction, while ignoring comprehension and schema theory, which is important to understanding and comprehension (Cassidy and Weinrich, 1998).

In her book *What Do the Experts Have to Say?*, Flippo (1999) said there have been efforts to educate the media, the politicians, and the public about the complexities of reading by the International Reading Association (IRA) and the National Council of Teachers of English (NCTE). Nevertheless, Flippo contends that there is a need for more action. She stated that unless reading experts wish to remain disenfranchised in the classrooms, they must concentrate on convergent, rather than divergent, opinions about reading instruction. Flippo emphasized that reading experts must convince politicians and the public that they know what is truly best for reading development, and more importantly, what is best for each child considering their needs and abilities.

Flippo (1999) gave a well-balanced presentation of the basic arguments of the phonics and whole language debates. However, she underscored the critical need for convergent opinions when she wrote about the practices that would facilitate learning to read. Experts in the field of reading agreed that these practices are effective ways of improving reading instruction. These practices are also components of the AR system and, although there are many practices in the book to examine, the following will serve as an introduction to this reading management system. Flippo said the experts unanimously agreed that educators

should (a) give students time to read real books, (b) provide a variety of printed material and literature in the classroom, (c) make reading functional, (d) use silent reading whenever appropriate to the specific purpose, (e) provide multiple demonstrations of how reading is done, (f) use many sources for student reading material, and (g) make student's self-perceptions and expectations positive.

Reading Instruction from an Empirical Perspective

The traditional background of reading instruction in the United States provided for a curriculum with a focus on a set of skills that involved decoding and comprehension (Dole, Duffy, Roehler, & Pearson, 1991). However, reading is not so much a set of skills to be mastered, but instead, a complex multifaceted process that requires a wide variety of instructional approaches (Snow et al., 1998).

Many methods and approaches exist for teaching children to read, but educators have not reached any consensus as to definitions of these approaches. Ekwall and Shanker (1985) contended that researchers have a difficult time determining which instructional method is the best because the teacher's differences are greater than the differences between their methods or approaches. Chall (1996) stated that knowing how reading was used in the United States during given periods and in given places was extremely difficult, therefore it can only be approximated and inferred. Although there are surveys of how well children achieve, there are no surveys of the instructional methods in use.

The following are some of the methods of instruction in reading. Ekwall and Shanker (1985) wrote of three commonly used methods of reading instruction:

basal readers, language experience method, and an individualized reading method.

Whereas, Allington and Cunningham (1996) contended that throughout this nation's history there have been four approaches to reading instruction: the alphabetic approach, the basal approach, the use of trade books, and the language experience approach.

The alphabetic approach involved the idea that written words are composed of patterns of 26 letters that represent the 44 sounds, or phonemes of spoken words. All students begin their reading instruction by learning the alphabet. The most common approach to reading instruction, in concert with learning the alphabet, is the use of basal readers (Goodman, Shannon, Freeman, & Murphy, 1988).

Basal reading programs, the most often used approach to reading instruction in America, (Britton et al., 1984; Ollila & Nurss, 1981) are pre-planned, sequentially organized, detailed materials and methods to teach developmental reading skills systematically. While they may differ in their emphasis, basal programs characteristically involve stories of gradually increasing difficulty and place a strong emphasis on teacher directed reading (Allington & Cunningham, 1996).

The third approach to reading instruction (Allington & Cunningham, 1996) involves the use of trade books. The use of trade books is an integral component utilized by the AR reading management system and is the focus of this research project. Jeannet Veatch (1959) introduced the concept of an individualized reading approach that involved the students selecting books they wanted to read

with the teachers conferencing with them when they needed individual help. In the 1980s, this trade book approach became part of the more familiar whole language instruction movement. The whole language philosophy placed an emphasis on creating meaning through reading and writing (Harp, 1991).

In the late 1980s, a fourth type of reading instruction appeared in the United State's classrooms. This approach, the language experience approach, had been more widely used in Australia and other countries (Allington & Cunningham, 1996). The idea is that the best material for children to read is their own original written work. This is what the language experience approach is based on. Thus, the stories that the students composed were their primary reading materials.

Flippo (1999) maintained that there are three main positions about the various approaches to reading instruction: the traditional, whole language, and interactive. The traditional perspective, also known as the text-based, specific skills, or bottom-up perspective, deals with how text is processed and relies heavily on phonics instruction. The whole language perspective, also known as the reader-based, holistic, or top-down perspective, is concerned with how readers process text. Flippo's third position is the interactive perspective, and is referred to as the integrated perspective of text processing because it uses both text-based and reader-based processing.

Chall's (1996) book, *The Great Debate*, served as a primer for understanding differences between two of the three positions on reading instruction: traditional, or phonics, and whole language. Together these two positions have incited the

great "reading wars" of reading instruction for over three decades (Nicholson, 1992).

Chall (1989) wrote that phonics instruction traditionally began with reading lessons that focused on decoding and making sense of the smallest components of the language, letters. It then progressed to larger components: sounds, words, and sentences, tightly controlled vocabulary, short basal reading passages, followed by numerous skills exercises with only one correct answer. Thus, in this traditional approach, children learned to read by learning to decode the language. Understanding, or comprehension, followed after they broke the code and mastered the components.

In contrast, Milligan (1988) reported that advocates of the whole language approach stress that children should use language in ways that relate to their own lives and cultures. The final product, the answer, is not as important as the process. Common techniques used in whole language teaching include daily journals, letter writing, silent and oral reading of real literature as opposed to basals, invented spelling, and fractured grammar. Throughout the years, these two major positions have fluctuated in popularity.

In the 1960s, Bond and Dykstra (1967) began a widespread study to determine the best approach to beginning reading instruction. They collected data from first and second grade classrooms around the country that used a variety of instructional approaches to reading. The study itself was inconclusive and virtually all the various approaches had some good and bad results. The teacher's

expertise at carrying out the approach seemed to determine how well that method worked.

The Bond and Dykstra (1967) study also concluded that some teachers used combination approaches that included language experience, basal or phonics, literature or literature and writing. These combination approaches worked better than any single approach. A more recent study (Adams, 1990) confirmed that students need a variety of direct instruction in letter sound patterns as well as a variety of reading and writing experiences. This variety of instruction combines the best elements from phonics instruction and the whole-language approach.

Strickland (1998) and other researchers (Adams & Bruck, 1995; Beck & Juel, 1995; Freppon & Dahl, 1998; Stice & Bertrand, 1990) called this an integrated approach to reading instruction. They suggested that students in the early grades be taught phonemic awareness and phonics in the context of real reading and writing. According to Adams and Bruck, with an integrated approach to reading instruction, children learn about the relationship between letters and sounds in a systematic, explicit fashion. At the same time, they are being read to, reading interesting stories, and writing. Anderson et al. (1985) stated, "the single most important activity for building the knowledge required for eventual success in reading is reading aloud to children" (p.23).

Although research has clearly established that no method of reading instruction is superior for all children (Bond & Dykstra, 1967), approaches that favor some type of systematic code instruction (phonics) along with meaningful

connected reading (literature based) have resulted in superior progress in student reading achievement (Snow et al., 1998).

Research has shown that instruction should focus on being able to identify important letter-sound relationships (decoding), which once learned are practiced through having many opportunities to read (Stanovich, 1986). Students begin to recognize words as decoding becomes more automatic. Thus, skilled reading involves fluent, accurate word identification (Juel, Griffith, & Gough, 1986).

Yet, research has also shown that instruction is more than simple word calling and that real reading involves comprehension. Children need to read a wide variety of interesting, comprehensible materials that they can read orally with about 90 to 95% accuracy (Durrell & Catterson, 1980).

Other researchers have shown that there are many benefits when meaningful connected reading (literacy) drives instruction. These benefits include the positive effects on a student's use of literature and his or her attitude toward reading in general (Morrow, 1992; Morrow, O'Connor, & Smith, 1990). In addition, consistent exposure to high quality literature is a key factor in understanding story structure, which creates growth in comprehension and improves writing skills. (Feitelson, Kita, & Goldstein, 1986; Morrow, 1992).

At-Risk Students and Reading

Bergman and Schuder (1992) stated that one of the worst problems having to do with at-risk students was how to teach the growing number of them to read. They also emphasized that many teachers utilized low-level textbooks and ditto

sheets which limited the amount of time for at-risk students to read real literature.

Honig (1997) stated that at-risk children need an organized system of instruction that involves decoding, vocabulary development, phonemic awareness, and letter-sound correspondence. These components were highly correlated with reading comprehension. Honig said the most effective way to develop these skills was to read extensively.

Many researchers have indicated that at-risk readers might need explicit decoding instruction and this instruction increases reading competence (Adams, 1990; Mather, 1992; Pressley & Rankin, 1994). Adams (1990) also stated that systematic instruction of letter-to-sound correspondence resulted in greater success in spelling and word recognition, especially for disadvantaged students.

Focusing on the sounds of words (explicit decoding) is definitely associated with later reading success in at-risk students (Adams, 1990). Indeed, in her third edition of *Learning to Read: The Great Debate*, Chall (1996) stated, "students at-risk for reading failure have long been thought to be deficient in phonological processing" (p.6). Adams (1990) and Stanovich (1986) have also stated that students who are poor readers, writers, and spellers have phonological processing deficits.

Snow et al. (1998) in their book, *Preventing Reading Difficulties in Young Children*, addressed the problem of at-risk students when they emphasized the three main reasons why children fail to acquire reading skills. The first obstacle faced is a failure to understand and use the alphabetic principle, the idea that

written spellings systematically represent spoken words. The second obstacle is a failure to transfer the comprehension skills of spoken language to reading. The third obstacle magnifies the first two, the loss or absence of an initial motivation to read and to appreciate the value of reading.

The following quote from *Preventing Reading Difficulties in Young Children* (Snow et al., 1998) serves to emphasize the underlying tenet of this research: motivation to read as presented in the AR reading management system is a key component to reading success.

> As in every domain of learning, motivation is crucial. Although most children begin school with positive attitudes and expectations for success, by the end of the primary grades and increasingly thereafter, some children become disaffected. The majority of reading problems faced by today's adolescents and adults are the result of problems that might have been avoided or resolved in their early childhood years. It is imperative that steps be taken to ensure that children overcome these obstacles during the primary grades. (p. 5)

Snow et al. (1998) goes on to say:

> Children from poor neighborhoods are more likely to begin school with less prior knowledge in verbal abilities, the ability to attend to the sound of language as distinct from its meaning, familiarity with the basic purposes and mechanisms of reading, and letter knowledge. Children from poor neighborhoods, children with limited proficiency in English, children with hearing impairments, children whose parents had difficulty learning to read are particularly at risk of falling behind from the outset. (p. 5)

Nevertheless, Snow et al. (1998) stated students at risk do not necessarily need a specific kind of instruction, but need much more intensive support.

Basal Reading Instruction

No analysis of the philosophy of reading instruction would be complete without focusing on the influence of basal reading instruction. Shannon and Goodman (1994) stated that teachers use basals because they believe the basal

materials can teach reading and are based on scientific knowledge. Miller and McKenna (1989) stated that using basal readers is not an approach but rather, "a collection of tools allowing for many different instructional approaches to reading" (p.336).

There is a great deal of research and criticism on basal reading instruction. Goodman et al. (1988) stated that basal reading programs, sold as an entire reading curriculum, usually begin with the kindergarten level and continue through eighth grade. Basal programs come complete with instructional strategies, materials, teacher's manuals, and student anthologies. They are an entire reading curriculum referred to as a "scope and sequence." Goodman et al. said they account for 75 to 90% of the class time devoted to reading in the United States.

Goodman et al. (1988) wrote that there are various reasons why basals are not good for reading instruction: (a) that the sequencing of skills in a basal reader exists because of the need to develop a reading series that can be taught sequentially on a daily, weekly, and monthly basis, time spans that correspond to a school calendar, without regard to how children actually learn how to read; and (b) that because of their emphasis on workbooks and skill sheets, basals take up a great deal of instructional time and leave very little room for other kinds of reading, despite the fact that overwhelming research shows that extensive reading and writing are crucial to reading development.

Durkin (1978-79, 1981, 1984) has shown that deficiencies exist in a basal's reading instructional techniques for comprehension. In her well-publicized study,

Durkin (1978-79) found only 45 minutes of direct comprehension instruction during 17,997 minutes of observations in 39 classrooms. The usual pattern for instruction was for students to spend the majority of their time with workbooks. In her 1984 study, Durkin noted that not one of the 16 teachers observed tried to build on prior knowledge, as was suggested in the basal teacher's manual.

Anderson et al. (1985) in their classic book, *Becoming a Nation Of Readers*, suggested, "independent reading is more effective in developing reading ability than the skill and drill workbooks and practice sheets normally associated with a basal reading program" (pp. 75-76). In addition, Allington (1994) made a case that schools need to supplement their basal texts with genuine children's literature. He claimed that many basal texts do not have a predictable story structure and that results in a story that students are not able to comprehend (Anderson et al., 1985). Allington (1994) also cited a basal reading series has a lack of available reading material in the form of supplemental books as a reason for why students read so infrequently.

Goodman (1986) said that a basal reading series tells teachers exactly what they should do and say while teaching a lesson. This deprives them of any real responsibility. Thus, teachers teach reading in a systematic routine sort of way, not making allowances for the interests of students. Indeed, Anderson et al. (1985) said because basal readers lack traditional story structure, students do not make as much progress in reading because the stories are not very interesting or comprehensible.

Anderson et al. (1985) added that schools that use basal reading programs may not be preparing students adequately for genuine literature or real world reading. In contrast, Goodman (1986) focused on teacher's attitudes when he said teachers assume they have taught well if they have taught the lesson, and that students have learned if they have given the correct answers. Unfortunately, this is not always the case. The media and politicians have reacted to this misconception about learning and such rigid control with strong political repercussions.

Independent Reading

Krashen (1993) identified independent reading as free voluntary reading. He stated that free voluntary reading works for everyone. Krashen also noted, "free reading studies and 'out of school' self-reported free voluntary reading studies show that more reading results in better reading comprehension, writing style, vocabulary, spelling, and grammatical development" (p. 12).

Perhaps one of the best-known examples of a free voluntary reading program is the "Hooked on Books" study conducted with boys in reform school (Fader, 1976). In the course of this research, each student was given a paperback book that could be exchanged for another at any time. The students were encouraged to read whatever they liked. After two years, the students had improved in reading comprehension, writing fluency, self-esteem, and in their attitude toward school. Students who were not in the program stayed the same or even worsened on these measures.

In another remarkable study, sixth grade boys who participated in an in-school free reading program for eight and one-half months not only did more leisure reading while in school, but they also were still reading more than comparison students six years later (Greaney & Clarke, 1973).

A common form of free reading is known as Sustained Silent Reading (SSR), a process whereby a student engages in the silent reading of one book for a specified period of time to develop fluency (McCracken, 1971). McCracken said poor readers especially enjoyed this form of reading because they were not fearful of making mistakes, whereas good readers enjoyed SSR because they did not have to demonstrate how well they could read. Both kinds of readers enjoyed reading more when they had access to interesting reading material (Rucker, 1982). Unfortunately, research has suggested teachers feel very uneasy when students are allowed to just read. This is probably a result of their traditional reliance on basals, direct instruction, and skill development. As a result, students are not allowed time to become absorbed in a story. Therefore, motivation is a very important component of reading because students have to want to read (Allington, 1994).

Motivation

As previously cited, Snow et al. (1998) listed the loss of an initial motivation to read as one of the major stumbling blocks that throw children off course when learning to read. Palmer, Codling, and Gambrell (1994) stated that teachers recognize motivating children to read as a high priority in the teaching of reading since many students are at risk of reading failure due to lack of motivation.

Mooney (1994) stated, "a motivated reader is well on the way to being a successful one" (p. 92).

According to Bettleheim and Zelan (1981), a child's attitude toward reading is very important and may directly determine his or her scholastic fate. They stated that the most important influence on this attitude and the child's subsequent ability to read is the manner in which the teacher presents reading and literature. This is a fact previously cited by Bond and Dykstra (1967) suggesting that the teacher's presentations had the most impact on achievement.

Bettleheim and Zelan (1981) stated children approach learning to read with excitement until this enthusiasm is eliminated by the endless use of rote learning and time spent on mastering decoding skills. Furthermore, Carbo (1987) reported that school systems fail to motivate poor readers by rarely using high interest materials and thereby placing them on an unequal basis with their higher-level peers.

Csikszentimihalyi (1991a) stated that the obstacles that stand in the way of learning are primarily motivational rather than cognitive. Hunt (1970) stated the importance of motivation in the acquisition of reading has been acknowledged for many years. He further noted that interest level is far more important than readability level. Hunt also said, when interested, students can frequently transcend their supposed reading level. Therefore, according to Hunt, the major barriers to literacy have little to do with the processing of information. The aesthetics of the experience is what determines the interest in what we are reading (Hidi, 1990).

Palmer et al. (1994) identified four variables that positively affected a student's motivation to read. These variables included prior experience and social interactions with books, book access, and book choice. Of the four variables identified, book access and book choice emerged as major components of literacy programs which foster motivational interest in reading (Johnston & Winograd, 1985; Putnam, 1994; Morrow & Weinstein, 1986).

Libraries

Krashen (1995) concluded there was a clear negative relationship between poverty and the amount of reading material in the home. Providing access to books usually involves a school or room library. He said libraries should provide print rich environments so students can access an abundance of free, accessible books. Krashen (1993) stated that 30 to 97 % of students obtain their books from some kind of library. Lance (1994) also stated that better libraries are related directly to better reading scores as measured on standardized tests. Indeed, Krashen (1995) said that in an analysis of score predictors for the NAEP, reading assessments that test the number of books read per student was one of the best predictors of success

McQuillan (1996) analyzed reading scores from 41 states, and he studied a variety of factors related to NAEP fourth grade reading scores. He discovered a negative correlation between poor at-risk students and the availability of print at home, and an equally positive correlation between the amount of print at home and the amount of reading children do. McQuillan found that better libraries resulted in greater library use. This, in turn, resulted in more free voluntary

reading and higher scores on the NAEP. In addition, research has shown that consistent and high-quality literature will expand a child's world and will be reflected in the breadth of his or her vocabulary (Robbins & Ehri, 1994).

Vocabulary

Adams (1990) wrote that the status quo in beginning reading instruction might be insufficient to meet the reading vocabulary needs of many diverse learners. A study by White, Graves, and Slater (1990) found that vocabulary differences between students appear early and the vocabulary gap grows increasingly larger over time. Snow et al. (1998) pointed to one possible link between vocabulary size and early reading ability when they said:

> The development of fine within-word discrimination ability (phonemic representation) may be contingent on vocabulary size rather than age or general developmental level. The potential immaturity of some children's phonological encoding/representation systems at the time formal reading instruction begins may impede their achieving a level of phonemic awareness for spoken words related to fluent decoding of written words. (p. 47)

For example, according to Juel (1988), there was an 88% chance that a poor reader at the end of first grade would remain a poor reader at the end of fourth grade. Even as early as kindergarten, sizable differences between students are found in the number of words known. However, the number of words learned varied greatly, as some students learned eight or more words per day, while other students are able to learn only one or two (Beck and McKeown, 1991).

Vocabulary development is a variable. Students learn an amazing number of words during their early school years, as many as approximately 3000 words per year on the average or eight words per day (Liberman and Liberman, 1990). Students with poor vocabularies, however, know alarmingly fewer words than

students with rich vocabularies (Beck & McKeown, 1991). In 1982, Graves, Brunetti, and Slater (cited in Graves, 1986) reported a study on differences in the reading vocabularies of middle class and disadvantaged first graders. Out of 5,044 words, disadvantaged first graders knew approximately 1,800 words whereas the middle class students knew approximately 2,700 words. Using a larger group of words (19,050), Graves et al. reported that disadvantaged first graders knew about 2,900 words and middle class first graders approximately 5,800 words.

Becker (1977) was among the first to highlight the importance of vocabulary development by linking vocabulary size to the academic achievement of disadvantaged students. According to Becker, one of the most important literacy skills for disadvantaged children is vocabulary acquisition. Chall, Jacobs, and Baldwin (1990) have stated reading problems of low-income children have to do with this literacy skill and not cognitive factors. Indeed, Adams (1990) claimed the only chance students with poor vocabularies have to catch up to their peers with rich vocabularies is by engaging in extraordinary amounts of independent reading. Therefore, vocabulary development is crucial to academic development. Becker (1977) linked the vocabulary size of at-risk children to their academic achievement and asserted that vocabulary differences were the primary cause of academic failure of at-risk students in grades 3 through 12.

Furthermore, because of the size of the gap, research has shown that directly teaching word meanings does not adequately reduce the gap between students with poor vocabularies versus rich vocabularies (White et al., 1990). Nagy and

Anderson (1984) argued that direct vocabulary instruction could cover only a small fraction of the words children need to know. They further stated teaching words individually would be futile. According to Nagy and Anderson, vocabulary instruction should help children become independent word learners.

Anderson and Nagy (1991) suggested that to facilitate strong vocabulary development students must develop independent strategies for learning the meaning of words as they occur in context. Therefore, students need to develop strong beginning reading skills to be able to engage successfully in the volume of reading necessary for them to learn large numbers of word meanings through reading connected text.

Since students in the primary and middle grades read anywhere from 100,000 to over 10,000,000 words of connected text per year (Nagy & Anderson, 1984), it is unnecessary for students to be efficient in deriving the meaning of words from text for the procedure to be successful in acquiring a sufficiently large vocabulary (Anderson and Nagy, 1991). Nevertheless, Anderson and Nagy insisted that improvements in beginning reading instruction are crucial. They stated that students, in order to develop a sufficiently large vocabulary, must engage in significant amounts of independent reading. Thus, early differences in vocabulary knowledge have strong implications for a student's long-term educational success (White et al., 1990).

Chall et al. (1990) in their book, *The Reading Crisis: Why Poor Children Fall Behind,* wrote that in the early years at-risk children were, in general, on par with mainstream (middle-class) children. However, they did notice a slump about

fourth grade, around age 10. The authors identified meaning vocabulary as the biggest problem for low-income children as subject textbooks become more demanding and require a wider vocabulary of less common words. They suggested that the vocabulary needed for subject textbooks be taught in school.

In addition, Chall et al. (1990) stated a strong literacy environment in the home was one of the strongest predictors of both reading and vocabulary knowledge. One of their most important recommendations was for at-risk students to engage in wide reading, an essential component to the development of automaticity and fluency.

Reading Instruction from the Accelerated Reader Perspective

The AR system was designed so teachers could have access to a computerized assessment of reading comprehension rather than using the more traditional and time-consuming method of book reports. It is part of a reading development program called "Reading Renaissance" and has been the most popular reading program of its type in the United States. It was introduced in 1986 by Advantage Learning Systems and is now used by more than 1,000,000 students in 8,000 schools nationwide. It is a computer-based reading and management program for students in kindergarten through high school (Advantage Learning Systems, 1986, 1994).

AR is also a literature-based reading system that relies on practice, mainly SSR, and it uses an author's original narrative and expository works to support children in developing literacy (Vollands, Topping & Evans, 1996). Research has

clearly shown that literature-based instruction helps all students become better readers, writers, and thinkers (Tunnell & Jacobs, 1989).

AR was designed to supplement the regular classroom program of basal reading instruction and is distributed by Advantage Learning Systems, a publishing company in Wisconsin. To use AR the students choose a book from the AR book list in their reading range. The current AR program lists more than 11,500 different books covering a variety of subjects, cultures, and grade levels (Advantage Learning Systems, 1986, 1994). These book lists provide choices for students from first grade through high school.

The Institute for Academic Excellence is the research arm of Advantage Learning. The Institute believes that focusing on literal comprehension questions reduces bias because it provides scaffolding for weaker readers. Scaffolding is a concept based on the ideas that at the beginning of learning students need a great deal of support. Over time, this support is gradually taken away to allow students to become more independent (Vygotsky, 1978).

In addition, literal comprehension questions take less time than open-ended questions. This allows the students to take the quizzes more quickly (Stiggins, 1997). This time factor is a big plus as it allows for more efficient classroom management and reinforces a major goal of AR, which is to "increase practice time for literature based reading" (Paul et al., 1996, p. 3).

Paul (1992, 1996) and the Institute for Academic Excellence advocated two basic points that they call the "theory of reading practice": the more students practice reading, the greater their increase in reading ability, and the law of

diminishing returns applies so that incremental amounts of reading will cause more growth in at-risk or poor readers rather than good readers.

Accelerated Reader Extrinsic and Intrinsic Rewards

One way to motivate people is to use extrinsic rewards or incentives. Peek (1995) stated that children should ideally learn to read intrinsically, without incentives. AR uses various kinds of extrinsic rewards to motivate students to take tests for assessment purposes as well as to read books for pleasure and information. The fear is that once the incentives are removed or are no longer attractive, students will not read or want to take quizzes. Research showed that AR quizzes could be motivational if they met the following criteria: (a) immediate feedback is provided, (b) students must feel that the quiz is not too intimidating, and (c) quizzes must be designed so that high scores are the result of a good performance and thus closely resemble a game (Black & William, 1998).

In addition, students rely on extrinsic incentives by being awarded points for reading a book and completing a quiz successfully. However, Donald Peek (1995) identified four key components that incentive programs must have to be effective in promoting an intrinsic desire to read. The first component involved accountability. Students using AR are held accountable for their reading through the quizzes they take.

The second and third components of an effective incentive program concern rewards. Rewards should be commensurate with the effort expended and should not be given equally. In the AR program, rewards for reading higher-level books

are greater and a graduated scale is used to promote growth by having students read books that are more difficult (Peek, 1995).

The last component advocated by Peek (1995) is giving feedback on children's progress. Children will become motivated when they can track their progress and see an increase in their reading and comprehension ability. Thus, Csikszentimihaly (1991a) stated that an activity is started for extrinsic reasons, and only with time does the activity become intrinsic, rewarding in itself.

Reading Practice and Fluency

Allington (1983) stated that fluency, which requires the ability to read a book accurately and quickly, is a neglected reading skill. Schreiber (1980) stated that fluency is the ability to effectively group words into meaningful units to facilitate interpretation. The National Research Council report, *Preventing Reading Difficulties in Young Children* (Snow et al., 1998), stated, "Adequate progress in learning to read English (or any alphabetic language) beyond the initial level depends on sufficient practice in reading to achieve fluency with different texts" (p.223).

In order to achieve fluency, decoding needs to be accurate and automatic, so that children become fluent readers able to derive meaning from print. When readers do not recognize and read with automaticity, a great deal of their cognitive energy or attention is expended in the struggling, labored process of decoding. They have few, if any cognitive reserves left to attend to comprehending, making inferences, monitoring understanding, or making connections (Samuels, 1988).

It is difficult for hesitant readers to construct meaning from text because they are struggling to sound out the words. Research has shown that students learn and remember more when conditions require them to understand the material (Anderson, Mason, & Shirley, 1984). Heibert (1983) found that low ability groups spent more time on meaning-related activities. Also, as children read they need to be taught to rely on the letters in the word as their primary means of word identification and discouraged from over-reliance on context and picture cues (Durkin, 1984). However, students who are engaged in reading on a daily basis may increase their knowledge in all academic areas, a kind of carry-over effect (Anderson et al, 1985; Stanovich, 1993).

Reading speed, an aspect of fluency and automaticity, shows gradual or incremental improvement through practice. Samuels has reported that for older struggling readers who have already learned the code but who are still reading below grade level, repeated reading is helpful in achieving automaticity, the skill of reading fluently with comprehension (Samuels, 1979, 1988).

Adams (1990) noted that reading fluency and comprehension depend on the speed and automaticity of word recognition. She goes onto say that:

> Although the words of a text necessarily arrive sequentially, the activation of each dwindles away quite rapidly once the eye has turned to the next word. Hence, the importance of speed: In order for each of a series of words to be aroused at once, all must be perceived in rapid sequence. The importance of automaticity relates to the fact that the search for coherence requires active thoughtful attention. Where the reader is instead wrestling with the resolution of any particular word, syllable, or letter of the text, comprehension is necessarily forfeited. For it to be recovered, the phrase must be reread with fluency for it to be covered. (p. 413).

Huey's (1908) classic study on psychomotor behavior and the reading process stated, "repetition progressively frees the mind from attention to details, makes facile the total act, shortens the time, and reduces the extent to which consciousness must concern itself with the process" (p. 104).

Thus, research has shown that reading practice can increase reading ability and a lack of reading practice can result in a decline in reading ability (Allington, 1977). According to other researchers, this lack of reading time has a negative impact on reading development and writing (Allington, 1994; Anderson, et al., 1985).

Taylor, Frye, and Maruyama (1990) found there was a direct connection between the amount of silent reading done in school and resultant growth in comprehension. In addition, Wilkerson, Wordrop, and Anderson (1992) have indicated a high correlation with the silent reading of text and reading comprehension. Thus, research reports clearly showed, "students get better at reading by simply reading, and that actual reading time is a crucial factor in becoming a successful reader" (Braunger and Lewis, 1997, p. 54).

Cunningham and Stanovich (1998) outlined in an article in *The American Educator*, the idea that exposure to print media and reading practice had a positive effect on student reading and cognitive abilities. They included data from several longitudinal studies that confirmed reading children's books and magazines had a profound positive effect on student vocabulary. Guthrie, Wigfield, Metsala, and Cox (1999) also supported findings from Cunningham and Stanovich. They found that motivation to read and reading volume are significant predictors of text

comprehension. Cunningham and Stanovich also cited a study by Anderson, Wilson, and Fielding (1988) that showed children who scored at the 90th percentile on standardized tests read 228 times more words per year than do children who score at the tenth percentile.

The AR reading management system relies on practice and motivation and emphasizes SSR, along with TWI, which stands for Read To, Read With, and Read Independently (Paul, 1996). Paul described this TWI term as a comprehensive and developmentally sound concept of reading practice.

According to Paul (1996), in his pamphlet *Patterns of Reading Practice*, there are four problems with in-school reading practice:

> (a) Too little time is set aside per day (Paul suggests 60 minutes as the ideal standard) for TWI; (b) Inadequate attention is given to Read To and Read With activities in the context of reading development; (c) teachers lack clear, specific expectations for student accountability and teacher intervention, in other words, very little information is forthcoming about student performance; and (d) pre-occupation with SSR which leaves kindergarten, first grade, special education students, ESL and other emerging readers out of the loop. (p. 11)

AR attempts to solve these problems by providing teacher training and program guidelines through its one and two day staff developments seminars held throughout the United States.

AR and Learning Information Systems

According to the Institute for Academic Excellence (1997), teacher intervention will prevent a student from reaching a frustration level because of the monitoring of at-risk reports printed by the teacher management software of AR and through the monitoring of reading logs kept by the teacher on each student. Snow et al. (1998) stated that adequate progress in learning to read also depends

on, "control over procedures for monitoring comprehension and repairing misunderstandings" (p. 314).

This teacher monitoring and intervention process is at the heart of what Advantage Learning calls Learning Information Systems (LIS). LIS assesses reading comprehension, tracks performance, and provides reports for teachers, parents, and students. The Institute for Academic Excellence (1997) said, "by providing timely, accurate information LIS allows teachers to adjust instruction and address the individual needs of each student" (p.6).

This idea is reinforced by Snow et al. (1998) in their book, *Preventing Reading Difficulties in Young Children*, when they stated diagnosis is the basis for differentiation of instruction and is essential for discovering each child's present needs.

Literature-Based Reading and Cognitive Processes

The success of AR and Reading Renaissance depends upon the theory of reading practice and literature-based reading. Therefore, an important question to ask is what is it about the actual process of reading practice that makes it so effective. Perhaps the answer lies in examining the role that brain research and schema theory play in how one reads and comprehends, the part critical thinking plays in the process of creating meaning from text, and how this may develop the individual's capacity for reading and learning.

Sheridan (1978) stated that traditional instruction in comprehension consisted of asking students questions about what they had read. Thus, skills taught in a

logical and sequential order would result in reading comprehension of textual material, in short a "skills model."

In contrast, Sheridan (1978) stated that a new model of reading comprehension, the Psycholinguistic Model, asserted that reading was, in actuality, a process of predicting meaning based on the reader's knowledge of oral language, syntax, semantics, and phonological cues. What this meant was some readers; especially those from literacy rich environments, already possessed some knowledge based on their oral language experience and their background of information about how language worked. Sheridan concluded that a reader's prior background (or lack thereof) of language and concept development would affect his or her reading comprehension. Indeed, Adams (1990) stated that highly familiar words could be processed instantly from sight to meaning because they have been learned and over-learned through experience.

Sheridan (1978) also stated that the emphasis of comprehension had now shifted. He felt skill's model theorists should recognize the need for skills instruction in context and that psycholinguists should recognize a greater need for readers to utilize grapho-phonemic knowledge, as well as semantic and syntactic cues.

It is important to understand that whether using the psycholinguistic or skills model theory of instruction, reading comprehension, according to reading researchers Pearson and Johnson (1978), is an interaction between the reader and the text. They stated that when a book is read the reader looks for patterns from their background of previously acquired knowledge. They defined "script" as a

special label for those experiences which have been stored. The system for storing and retrieving this knowledge in memory (scripts) is known as schema theory (Spiro, 1980; Rumelhart, 1980).

This interaction between reader and text is a cognitive approach to reading and learning. Cognitive theorists such as Piaget, Bruner, and Vygotsky view knowledge as a constructed entity. Therefore, knowledge is formulated by each learner through his or her own distinct learning process (Piaget, 1926; Vygotsky, 1962; Bruner, 1966). This learning process is called constructivism, which is based on research done by Piaget. Piaget said this cognitive mental process could be described as an experience of knowing, as distinguished from a behaviorist experience of feeling or willing. The process itself, according to Rumelhart (1980), consisted of creating a model, or schema, in which every piece of information was related to other information in a way that helps us to experience the world as coherent and predictable.

Rumelhart (1980) stated that the associative nature of our schema helps us to quickly recall information stored in our memories and apply abstract concepts to create new insights and solutions. He stated that our minds are scanning and seeking questions and answers constantly, and as we encounter a new and unfamiliar experience, we strive to fit it into our conceptual map of the world. This cognitive process of storing information and creating insights leads to the question of how this really happens within our brains and what connection there is, if any, between that and the emphasis of AR on the practice of reading and literature based reading.

Brain researchers have learned that the brain builds neural networks to process information and that there are two kinds of memory: taxon memory, which involves the storage of fixed, context-free information; and locale memory, which involves the development of "conceptual maps" (Institute for Academic Excellence, 1997). Taxon memory is the place in our brains where words are identified visually in the reading process. It is very rigid and is associated with fixed content-free information, as in rote-learning exercises (Caine & Caine, 1991).

Caine and Caine (1991) stated in contrast, locale memory involves creating patterns of information or finding a way around a subject and making connections between facts. Locale memory is where meaning takes place in the reading process and involves critical thinking, which includes higher order thinking skills such as evaluation, analysis, and the synthesis of new connections (Caine & Caine).

According to Yale university scientists, a third part of the brain is also critically important to the reading process. This is the part of the brain involved in phonological processing. These scientists have said in order to read well different areas of the brain must decode words by translating them into speech sounds. The brain is designed to talk, not to read. Thus, the brain has to identify the word the letters represent and draw on the brain's general cognitive processes to find its meaning (Hotz, 1998).

Hotz (1998) reported that according to brain research, the process of reading involves three areas of the brain working together to create patterns of thought

and meaning (comprehension). They are: phonological processing, (identifying the sound); the utilization of locale memory (word meaning), which involves using higher order critical thinking skills such as evaluation, analysis, and synthesis; and taxon memory (visual identification).

Caine and Caine (1991) reported that this search for meaning is one of the core beliefs of brain-based learning, and that the brain's search for meaning comes through patterning. Thus, reading practice, the actual process of reading, also involves creating and revising patterns of information (Spiro, 1980).

Rumelhart (1976) called this reading comprehension process an interactive model. This model is neither meaning-based (whole language) nor code-based (phonics), but is instead a synthesis of the two. Spiro (1980) also implied that reading comprehension is a multilevel interactive process. Text must be analyzed at various levels with units of analysis going from a letter to the text as a whole. Spiro stated the importance of the interaction of text-based and knowledge-based processes within reading comprehension when he said the reader must bring considerable background and preexisting knowledge to the reading comprehension process.

Thus the reader, through the actual act of reading, interacts with the text to interpret and comprehend (Nagy, Herman, & Anderson, 1985). Perhaps the most important aspect of this analysis is the fact that the reader's personal history, background, and prior knowledge (or lack thereof) are brought to bear when constructing schemata to provide the interpretative framework for reading comprehension (Anderson & Pearson, 1984). Therefore, children should be

given opportunities to build on both vocabulary and prior knowledge by reading frequently and widely, across a range of subjects (Bransford & Johnson, 1972).

However, as good as this sounds, Goodman (1986) stated that, in contrast, basals require more time for reading instruction which consequently diminished the time for students to actually engage in the practice of reading. White, Vaughan, and Rorie (1986) made an important distinction between what they called the skilled readers associated with basals, and the accomplished readers associated with literature based reading. According to White et al., accomplished readers are in control of their own reading and tend to understand more than remember. In addition, they appreciate and understand the purpose and process of reading relevant, meaningful texts. Thus when a relevant text is read, accomplished readers construct patterns of meaning by learning their way around the book rather than memorizing it.

The psychologist Mihaly Csikszentimihalyi (1991b), as cited in *Critical Thinking and Literature-Based Reading*, stated that constructing patterns of meaning through reading relies on a very simple truth: students must be able to balance their skills in comprehension with the challenge of the reading at hand. Csikszentimihalyi noted that when a student is challenged above his or her ability to comprehend, the result is anxiety, frustration, boredom, and a lack of motivation. However, he said with the proper balance between skill and challenge an individual could have a sense of mastery at the peak of his or her ability. He called this sense of mastery the "flow state." He said this results in both cognitive development as well as the intense enjoyment of intrinsic motivation.

Vygotsky (1962) also discussed this idea of a balanced challenge with his concept of ZPD. Vygotsky stated that the point between unchallenging and frustratingly difficult text, the point at which maximum growth occurs, is the ZPD. According to the Institute for Academic Excellence (1997), one of the most important components of AR and literature-based reading practice is to "use teacher intervention and feedback to guide each student to reading material at the appropriate level of challenge and interest to meet his or her developmental needs" (p.5).

The practical application of this concept is embodied in the readability levels of AR reading texts in which familiar words provide contextual clues to the meaning of more difficult words. For example, common sense would dictate that without teacher intervention and monitoring of students' reading levels a child with an intermediate grade reading level who is reading a primary grade level book would have very little, if any, growth in reading level ability. However, if the teacher does monitor the reading levels of the students, then as they approach their ZPD, growth in reading occurs at an accelerated rate. This is because the students are exposed to more difficult, but manageable (semantic) vocabulary and (syntactic) sentence structure (Institute of Academic Excellence, 1997).

The Institute of Academic Excellence (1997) stated that "even though a student may read independently this can be considered assisted reading because the assistance to discover the meaning of new words and concepts is provided by the known portion of the text" (p.6). Snow et al. (1998) reiterated this point when they wrote, "well-written and engaging texts that include words that children can

decipher give them the chance to apply emerging skills with ease and accuracy, thereby teaching themselves new words through their relation to known words" (p.195).

In *Becoming a Nation of Readers*, Anderson et al. (1985) are very specific when it comes to text selection. They state that primers should be, "interesting, comprehensible, and instructive" and that, "there is a natural relationship between word identification and comprehension" (pp. 58-59). Adequate progress in learning to read depends on, "sufficient practice in reading to achieve fluency with different kinds of text written for different purposes" (Snow et al., 1998, p. 314). Spiro, Bruce, and Brewer (1980) stated that it is very beneficial when the texts are highly predictable and redundant so that higher level processing may make up for deficiencies in lower level processing.

The Institute for Academic Excellence (1997) reported, "for any given student there will be a range of reading difficulty in which the text itself provides instruction that most effectively promotes both comprehension development and the exercise of critical thinking. This range is referred to as the ZPD reading level" (p. 6). Thus, the Institute of Academic Excellence stated that the texts themselves should provide a consistent type of scaffolding to support students while they acquire competency in reading. Conversely, at some point, it would also seem that without teacher intervention and monitoring, the vocabulary and sentence structure would become too difficult. At that point, students would eventually reach their frustration level, where reading comprehension would drop very rapidly to zero.

Research on Accelerated Reader

There have been a number of studies, both qualitative and quantitative, that have analyzed the effectiveness of the AR program. Terrance Paul is one of the founders of Advantage Learning Corporation, the company that sells and markets AR. He has done three extensive correlation studies that have examined a very large sample of students.

Paul (1992) designed his first study to test his theory of reading practice. His theory of reading practice is a fundamental component of the AR reading management system. Paul predicted that reading practice caused different rates of reading growth, depending on reading ability and age. Paul analyzed AR program and reading test data from a sample of 4,498 students aged 6 to 16 in 64 elementary and middle schools.

One questionable aspect of the methodology of this study was that each school was sent an invitation to send their data for analysis, so the representation of the sample is open to question. Specifically, analysis centered on how many points students accumulated based on their respective reading levels from pre- to posttest estimates. AR points were regressed against reading gains from pre- to posttest, and the scores measured against reading growth in reading level scores from 1990 to 1991 (Paul, 1992). Analysis indicated a rather strong relationship between the number of points accumulated and gains in reading scores, with the lowest ability students realizing the greatest gains. This aspect of AR, that the lowest students made the greatest gains, was the most important reason why Alpha School implemented AR.

Paul's second study (Paul, 1993) was another attempt to validate his theory of reading practice. This time Paul used a much larger sample, 10,124 students in first through ninth grade from 136 schools across the nation that were using the AR program. Data analysis was similar to his 1992 study except that he used 12 different standardized tests. Paul divided the students into ability quartiles based upon percentages rather than grade ability from posttests. The results from this study seemed to validate his theory of reading practice, that younger, poorer readers made more significant gains than older and more proficient readers.

In his third study (Paul, 1996) entitled Patterns of Reading Practice, Paul used the largest sample to date. There were 659,214 students from kindergarten through twelfth grade, from 2,193 schools across the nation for the 1994-95 school year. This study tried to determine if there were any discernable patterns as to the grade level of students, size of school, and the variation in points due to the amount of reading done by students and the resultant variation in the number of points they accumulated.

Paul's (1996) study revealed the following results: AR points declined after the fifth grade, students who were in the top five percent of point earners read 144 times more than students in the lowest five percent, and fourth and fifth graders averaged 12.8 minutes a day of SSR, the most of any group. The average daily time devoted to reading for all grade groups was a dismal 7.1 minutes. Paul's study also concluded that the longer that AR was in use, the more effective it became, especially in small schools. It is important to note that Paul conducted

all of these studies and that they were published by the Institute for Academic Excellence, the research arm of Advantage Learning.

Several other researchers, working in conjunction with the Institute for Academic Excellence, have examined the effectiveness of the AR program. Peak and Dewalt (1994) conducted a five-year longitudinal study that involved analyzing data from 50 students from two different schools similar in curriculum and socioeconomic status, third to the eighth grades. In this study, only one of the schools (experimental school) used AR, while the other (control school) did not.

Results from the reading scores on the California Achievement Test (CAT) indicated that the students in the AR experimental group experienced an average of 15.3 and 13.2 scale score points per year in reading growth from grades three through six and six through eight, respectively, as opposed to 10.2 and 5.5 points per year for the control students. Thus, Peak and Dewalt (1994) concluded that since AR represented the only variation between the control and experimental schools language arts curriculum, this indicated a significant increase in student achievement in reading.

Paul et al. (1996) conducted a large-scale study in Texas elementary, middle, and high schools involving statewide-standardized tests. They compared AR software used in 2,500 schools with 3,500 schools that did not own the software. The schools had students of similar socioeconomic status. The results indicated that AR schools performed on a statistically significant higher level in all grades with the exception of sixth and tenth grades.

A major study on AR's effectiveness was conducted in Tennessee on 62,739 students from grades two through eight. Data from AR were merged with data from the Tennessee Value-Added Assessment System (TVAAS) teacher-effects database to determine if there were any relationships between these independently obtained measures (Sanders &Topping, 1999). The TVAAS annually tests all children in Tennessee in grades three through eight in science, math, reading, language arts, and social studies. The TVAAS system then enters the test-result data into a longitudinally merged database of achievement. Then a longitudinal, mixed-model, multivariate analysis is applied in which every student is his or her own control, which allows for a yearly on-going assessment of each student to be estimated. The purpose of this assessment system is to create an unbiased estimate of student achievement and the effectiveness of school systems, schools, and teachers.

Analysis by Sanders and Topping (1999) showed that AR quiz scores, as measured by TVASS, had a consistently positive and statistically significant impact on teacher effectiveness. This particular study measured value added at 80% correct in grades three and four, and 85% in grades five to seven. This result seemed to validate the recommended level of 85% correct on AR reading practice quizzes prescribed by Vygotsky's (1962) ZPD principles. In addition, two other important findings arose from this study. First, the study concluded that teachers with Reading Renaissance training were significantly more effective than teachers who had not taken the training. The second finding involved Reading

Renaissance model fourth and fifth grade classrooms. Those classrooms showed higher effectiveness than the non-model classrooms.

In addition to the studies funded by the Institute for Academic Excellence, independent researchers have also done further research on the effectiveness of the AR program. McKnight (1992) in his doctoral thesis conducted a largely qualitative study that used multiple measures (surveys, observations, questionnaires) on an at-risk student population of 17 fifth-grade students who attended Chapter I remedial reading classes. At the end of the11week study, more than one-half of a fifth grade class that had previously lacked motivation to read showed greatly improved attitudes toward reading. However, it should be noted, that because of the short duration of the study, the Hawthorne effect (Cook, 1963) might have been present. In addition, there was no control or comparison group as part of the research design.

The Mathis (1996) study examined the use of the AR program on sixth grade reading scores on the Stanford Achievement Test (SAT). The 30 students in this study were from rural Illinois. The purpose of the study was to compare sets of test scores to see if there was a statistically significant change in reading comprehension net gain scores from fifth to sixth grade after only a year of exposure to the AR program. Mathis found no statistically significant differences. However, he believed that the reason for this lack of statistical significance was that students selected books below their ZPD reading level, and did not realize any gains because they were not motivated or challenged enough (Mathis, 1996).

CHAPTER III

THE PROCEDURE

Type of Research

The primary purpose of this study was to investigate the effects of a computer-assisted reading management system, AR, on selected at-risk students. A secondary intent was to determine any possible interaction effects between the independent variables. The research design is quasi-experimental, utilizing multivariate analysis of variance. Collected data included archival norm-referenced test data. The statistical results are descriptive in nature.

Population and Sample Description

The population involved in this study included a stratified sample of at-risk students. Archival data were collected on students who had taken the CTBS (Terra Nova) during the annual district-wide testing, during the years 1997, 1998, and 1999. The population of this study was second through sixth grade at-risk and not at-risk students from two Title I elementary schools in a metro-east Illinois suburban school district near St. Louis, Missouri.

Students from one of the elementary schools (experimental) had been exposed to the AR reading management system since the spring of 1997, in addition to the district basal reading series. In contrast, the students from the control school had only utilized the district basal reading series. All of the district's elementary schools began using a new basal series, beginning in 1997. This basal series included anthologies, phonics, and skill and drill supplemental materials.

The experimental school had an average of 73% of the students at-risk over the three- year period from 1997 to 1999. The control school had a three-year average of 48% of its students at-risk (Illinois State Board of Education, 1999).

Data Collection Technique

The researcher utilized archival document review. Data for this study were collected from food service records, permanent school records, and computer printouts from McGraw-Hill Terra Nova test results. The school district's reading improvement coordinator collected the data so the researcher would only have access to the data after they were compiled. The reading improvement coordinator utilized school district food service records to stratify the two groupings, free and reduced economic status. The two groupings were: free or reduced paid students who represented the below poverty level grouping and the paid lunch group, which represented the above poverty level students.

The reading improvement coordinator used the following process to stratify the groups to obtain test scores, determine who had taken the tests for three consecutive years, and determine economic status. First, she used two separate spreadsheets containing assigned identification numbers and student names. She indicated socio-economic status and whether the students had taken the test three consecutive years by placing a number on the sheet for free or reduced pay status and another number for those who paid full price for lunches. When she completed segregating the student data, she removed the names of the students before returning the sheet to the researcher. The second spreadsheet had identification numbers that corresponded to student's names and the test scores

were recorded on this spreadsheet. When all the test data were compiled, the student names were removed so that the researcher would not breach any form of confidentiality.

The CTBS Terra Nova scores were segregated in the following manner: reading SS, which measured reading and vocabulary; the NCE scores for reading; the NCE total composite scores; and the total SS, which included reading/language arts, language mechanics, spelling, mathematics, and math computation. All of these were obtained from the school district permanent records of each student. These scores are distributed to the parents every fall.

The district had four Title I schools, however, the other two schools not involved in the study were exposed to the AR system during this three year span of time. The experimental school and the control school had a total of 1,285 scores from the second through the sixth grades over a three-year period of time from 1997 to 1999. The scores from both schools were segregated into the following groups: 108 second grade at-risk scores and 164 not at-risk scores for a total of 272; 118 third grade at-risk and 152 not at-risk scores for a total of 270; 109 fourth grade at-risk scores and 153 not at-risk scores for a total of 262; 83 fifth grade at-risk scores and 170 not at-risk scores for a total of 253; 83 sixth grade at-risk scores and 145 not at-risk scores for a total of 228. The final three year total for both schools was 501 at-risk scores and 784 not at-risk scores, a total of 1,285 scores.

At this point the student data from these scores were disaggregated into two stratified groups of 141 students (at-risk and not at-risk) of three cohorts of

students who had taken the CTBS test for three consecutive years at the experimental and control Title I schools. Student scores were divided into those considered at-risk and those not at-risk. The at-risk group of 31 students and 72 not at-risk students at the control school (Beta) and the experimental school group of 38 students at (Alpha) consisted of: cohort one (grades two, three, and four), cohort two (grades three, four, and five), and cohort three (grades four, five, and six). Only the control school included both at-risk student and not at-risk student cohorts. There were not enough not at-risk students at the experimental school to create a cohort. At-risk students were defined at both schools as students who received free or reduced lunches. However, the poverty level (free or reduced lunch) status of these students was not stratified. More than 50% of the at-risk students from the experimental school were from a public housing project.

Instrumentation

The Terra Nova, introduced in the fall of 1996 after four years of intensive research, is CTB/ McGraw-Hill's newest achievement test. Latin for "new ground," Terra Nova was created with three goals in mind: match the lively appearance and content of today's classroom instructional materials, measure student knowledge and achievement in many ways, and give teachers valuable information on how to improve instruction (Holden, 1998).

Gregory J. Cizek in his 1998 article, *Filling in the Blanks: Putting Standardized Tests to the Test,* stated that Terra Nova is a combination of a traditional norm-referenced battery and alternative assessments. It consists of five components: 1) a traditional CTBS component; 2) a multiple assessment

component that comprises both the traditional, multiple-choice portions of the CTBS and constructed-response items; 3) a performance assessment component, which increases the extent of constructed-response items in communication arts, mathematics, science, and social studies; 4) a writing assessment; and 5) a custom component that permits inclusion of items to assess educational objectives peculiar to a specific state's or district's curriculum.

Cizek (1998) stated that the most common configuration of Terra Nova is the multiple assessment versions, which includes both traditional and alternative item types within the same test booklet. This study used the traditional CTBS component, composed of the CTBS basic battery and basic battery plus editions. This test targeted the areas of reading, language, and mathematics, comprising test levels 12 through 16. In addition, the battery plus edition added supplementary tests in word analysis, vocabulary, language mechanics, spelling, and mathematics computation.

McGraw-Hill determined that page layout and graphic design played an extremely important part in student performance on standardized norm-referenced tests. Therefore, they made numerous changes in Terra Nova's grade-level design limits for amounts and variations of illustrations, use of color, length of passages, and variations in page and item layout. Thus, McGraw-Hill wanted to ensure that Terra Nova was free of distraction and confusion and that the new graphic design had a positive effect on performance, readability, timing, and was verifiable and as efficient to use as traditional, less engaging tests (CTB/McGraw-Hill, 1996).

The Terra Nova 1996 norming group was based on a stratified national sample. The stratification variables used were geographical region (northeast, southeast, mid-west, or west), community type (large urban, urban, suburban, or rural), school size (small or large), socioeconomic status (high or low), and school type (public, Catholic, or private non-Catholic). Thus, the fall and spring 1996 norming studies involved between 860,000 and 1,720,000 test administrations across the nation. The test involved identifying stratification cells based on national census data. In order to represent these national proportions appropriately, and in the process of developing these norms, scores for students in the Terra Nova standardization group were weighted (CTB/McGraw-Hill, 1997b).

Cizek (1998) stated that Terra Nova illustrates the recent trend of integrating assessments across content areas and incorporating assessments that tap both cognitive and affective dimensions. In addition, Cizek stated, like other major test batteries, the development of Terra Nova emphasized an attention to "thinking skills." Item development was organized around six cognitive skills: gathering information, organizing information, analyzing information, generating ideas, synthesizing elements, and evaluating outcomes (Cizek, 1998).

Validity and Reliability

Cizek (1998) reported that reliability and validity data for Terra Nova are similar to those of the other major norm-referenced test batteries. He said that primary validity for all norm-referenced tests is content validity, that is, the validity of the test scores and interpretations is based upon the extent to which the test reflects appropriate content for the ages, grade levels, and subject areas tested.

Terra Nova emphasized this connection to content validity by stating in its teacher's guide that "each content area reflects the intent and processes described in the secretary's Commission on Achieving" (CTB/McGraw-Hill, 1997a, p.12).

Cizek (1998) also explained that all major norm-referenced tests begin with a review of current curriculum materials, textbooks, and teaching practices. He went on to say that reliability coefficients are usually high, in the range of .80 to .90. The reliability of the complete battery is usually higher than the individual content area tests (e.g. reading). Reliability coefficients for longer tests tend to be higher than for shorter tests, and the reliability of whole content area tests (e.g., reading) tend to be higher than their subtests (e.g., word analysis).

In a review of the CTBS, fourth edition, Kramer and Conoley (1992) suggested that Terra Nova might be compared to its most previous version, the CTBS-4. In that report, CTBS-4 had generally strong content validity and reliability in the .90s for the complete battery and in the .80s for individual tests.

In addition, Cizek (1998) pointed out another feature common to most standardized achievement batteries: reliability values tend to increase with the level of the test. Thus, according to Cizek, scores are more reliable as children progress through the grade levels. Levels 12 through 16 (corresponding to grades second through sixth) of the test were given in the metro-east school district Terra Nova assessment. In conclusion, Cizek cautioned against putting too much confidence in scores for students at the lowest grade levels. This admonition applies to all the major test batteries.

Design of the Study

The design of this study was quasi-experimental and incorporated a systematic plan developed by the Title I committee of Alpha Elementary (experimental) School. The committee recognized that this school had among the worst reading scores in the school district and that something needed to be done. Therefore, a plan was devised, utilizing supplemental Title I funds, that involved a systematic three year timetable for incorporating the AR reading management system, Reading Renaissance teacher intervention program, and staff development practices to Alpha School.

The first part of Alpha School's plan involved purchasing computer hardware and AR and STAR software. Then an AR library was set up according to the reading levels of the students. This involved purchasing AR book sets with their respective software. An extrinsic reward system (AR store) was created as a way to motivate students to accumulate AR points earned from reading and passing AR tests. It was also important to enlist volunteers to run the library and secure an AR reading aide to facilitate data entry and help with technical assistance for the various kinds of software. However, perhaps the most important component was incorporating SSR throughout the school using the books from the AR library as a supplement to basal reading instruction.

The second part of the Alpha School plan involved staff development and training in how to use AR software (e.g. at-risk reports, TOPS reports- three opportunities to praise a student, and the 20 plus management reports), STAR software, and more importantly, intervention and remediation strategies that

would be learned at the Reading Renaissance seminars offered by Advantage Learning Corporation. These one and two day seminars would be incorporated into the aforementioned school-wide Title I plan, with all teachers participating on a three-year timetable.

The most important factor of this design was the researcher and the Title I committee's belief that at-risk students, because of their poor language acquisition and development, need more than a standard basal reading instructional series. Therefore, a kindergarten transition class was created to help students who had failed because of poor language skills. The intent of this class was to allow students to catch up, not to rehash the previous year. It also used the AR system in conjunction with the Open Court Reading Series that emphasized phonics instruction. The entire school from kindergarten through the sixth grade used the AR program.

The Title I committee and the researcher believed that the theory of reading practice, which called for SSR and the utilization of AR and the Reading Renaissance program espoused by Terrance Paul, of the Institute of Academic Excellence (research arm of Advantage Learning), was a valid process for addressing the literacy needs of the at-risk students at Alpha School. In addition, the Title I committee and the researcher also believed that using literature based reading would provide an effective supplement to traditional basal reading instruction for at-risk students. Thus, the Title I committee and especially the researcher, believed that it was necessary to create the tools to implement this

system, and more importantly to empower the teachers who would utilize it, so they would have a sense of ownership.

In order to compare and contrast the literacy components used at the Alpha Title I elementary school, the researcher decided to analyze the performance of another Title I school. This school had not used any of the AR and Reading Renaissance curriculum strategies, or techniques, nor created an AR library or a transition class.

Although Beta (control) School did create a library, their books were not labeled according to reading levels. All books in the AR library at Alpha School were coded with colored dots to denote reading level. In addition, there was no testing of the students at Beta School to determine their knowledge or comprehension of the library books, except by time-consuming traditional methods, whereas at Alpha School, all students took a STAR test at the beginning of the school year to determine their individual reading level.

When students went to the AR library, their respective reading levels were matched to the books they selected. This match is the major difference between an AR and a regular library. The students read the book, took a test, and an AR software program tracked their score and printed it out on an at-risk report. This is less time consuming than traditional methods. Teachers monitored the reports so that students were in their ZPD range of between approximately 80 to 90%. They could then continue to read books within that range.

In an AR program teachers react when students do not comprehend a story within their ZPD range. The teachers monitor the reading logs kept by their

students in order to intervene and place them in the correct reading level book. This is done when student's AR scores are higher or lower than their ZPD level of 80-90%. To promote growth and prevent frustration by matching reading levels to ZPD is a critical component of AR.

Two important factors are inherent in the design of this study: the theory of reading practice that calls for SSR that is monitored constantly by the teachers and the use of literature-based reading to supplement traditional basal reading instruction. Because of these inherent features, Alpha School mandated at least 30 to 60 minutes of reading time per day, either with students being read to, reading independently, or with older students as reading buddies for younger students. More importantly, the teachers were committed to using AR on a daily basis because they were involved in the design and implementation of the program.

In addition, the creation of the AR library allowed the teachers to supplement their basal reading anthologies with rich and interesting texts chosen by their students. Beta School only used the traditional basal series, albeit a new one, with a regular library and no commitment to SSR and no effective system to monitor how well the students were reading.

Analysis of Data

Since the data obtained in the investigation was interval level and there were more than two dependent variables, it was deemed appropriate to use the multivariate analysis of variance. The researcher used a 2X3 factorial analysis of

variance to test for differences according to treatment condition, as well as interaction effects between the independent variables.

The analysis was conducted utilizing computerized calculations according to a program entitled Statistical Packages for the Social Sciences. Discussion of the results and their comparative implications will follow in the succeeding chapters.

Specific techniques to test each hypothesis were as follows:

1. There will be no statistically significant differences on scores between reading SS, total SS, NCE reading scores, and NCE total composite scores between students for the three cohort groups.

   Test: This hypothesis was tested utilizing multivariate analysis of variance.

2. There will be no statistically significant differences on reading SS, total SS, NCE reading, and NCE total scores for the two comparison (experimental at-risk and control at-risk) cohort groups.

   Test: This hypothesis was tested utilizing multivariate analysis of variance.

3. There will be no statistically significant interaction between the cohort and comparison group variables.

   Test: This hypothesis was tested utilizing multivariate analysis of variance.

Conclusion

The research design used to examine AR provided a descriptive and quantitative study between Alpha and Beta Schools. Student test scores were collected from school district archival data. This design enabled the researcher to focus on AR as a treatment for at-risk students in an effort to determine the statistical significance of AR at Alpha School. The researcher believed that, in designing this study, a valid comparison between these two schools might determine whether the intervention and supplemental strategies and materials associated with AR were effective practices for at-risk students in Title I schools.

CHAPTER IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF THE DATA

Presentation

The purpose of this chapter is to present an analysis of the data collected to determine if there is a significant difference between at-risk students from the experimental school who utilized AR, in addition to the basal reading program, and at-risk and not at-risk students from the control school who only used the basal series.

The entire metro-east district began using a new basal series during the first year of this study and subsequently during the remainder of the three-year study. An analysis of the control and experimental group's NCE reading, NCE total change, reading SS, and total SS scores on the CTBS Terra Nova tests was performed to determine statistical significance. Total SS and NCE total composite scores included: reading/language arts, language mechanics, spelling, mathematics, and math computation.

This study utilized a multivariate analysis of variance with the at-risk and not at-risk cohort groups as independent variables and changes over time in each test (reading SS, total SS, NCE reading, and NCE total) as dependent variables. The experimental group consisted of thirty-eight at-risk students in three cohorts from second to sixth grades. The control group consisted of thirty-one at-risk students and seventy-two not at-risk students in three cohorts from second to sixth grades. Except for special education students, the metro-east district gave the CTBS tests in the fall of every school year.

Analysis

In order to analyze the data, a 2x3 factorial analysis of variance is carried out on each of the dependent variables. A 2x3 summary analysis of variance table is reported for each dependent variable (see tables 1-4). An explanation of the statistical results for each variable is presented along with a tabular presentation and a figure illustrating those results. Preceding the tabular presentation is a restatement of the hypotheses related to each variable, and following the tabular presentation is the decision regarding each hypothesis.

Interpretation of the Data

This study is designed to determine if there was any significant differences in scores according to treatment condition and whether there was any statistically significant interaction effects between the experimental and control cohorts. The researcher utilized three null hypotheses to test for statistical significance, they are:

Null Hypothesis 1 (Ho1): There will be no statistically significant differences on scores between reading SS, total SS, NCE reading scores, and NCE total composite scores between students for the three cohort groups.

Null Hypothesis 2 (Ho2): There will be no statistically significant differences on reading SS, Total SS, NCE reading, and NCE total scores for the two comparison (experimental at-risk and control not-at-risk) cohort groups.

Null Hypothesis 3 (Ho3): There will be no statistically significant interaction between the cohort and comparison group variables.

Tests of Between-Subjects Effects

Table 1.

Summary Analysis of Variance Table For Norm Curve Equivalent Reading Change

Source	df	SS	MS	F-Statistic	P
Cohort	2	74.368	37.184	.218	.805
Compare	1	488.147	488.147	2.857	.096**
CohortxCompare	2	225.729	112.865	.661	.520
Error	63	10763.623	170.851		

(p<.05)* (p<.10)**

The NCER data are displayed in Figure 1. For NCER, the researcher failed to reject Ho1 & Ho3. However, there was a marginally significant effect of comparison groups, F (1,63)=2.857.

Figure 1.

Improvements in NCE Reading Scores Over Three Years

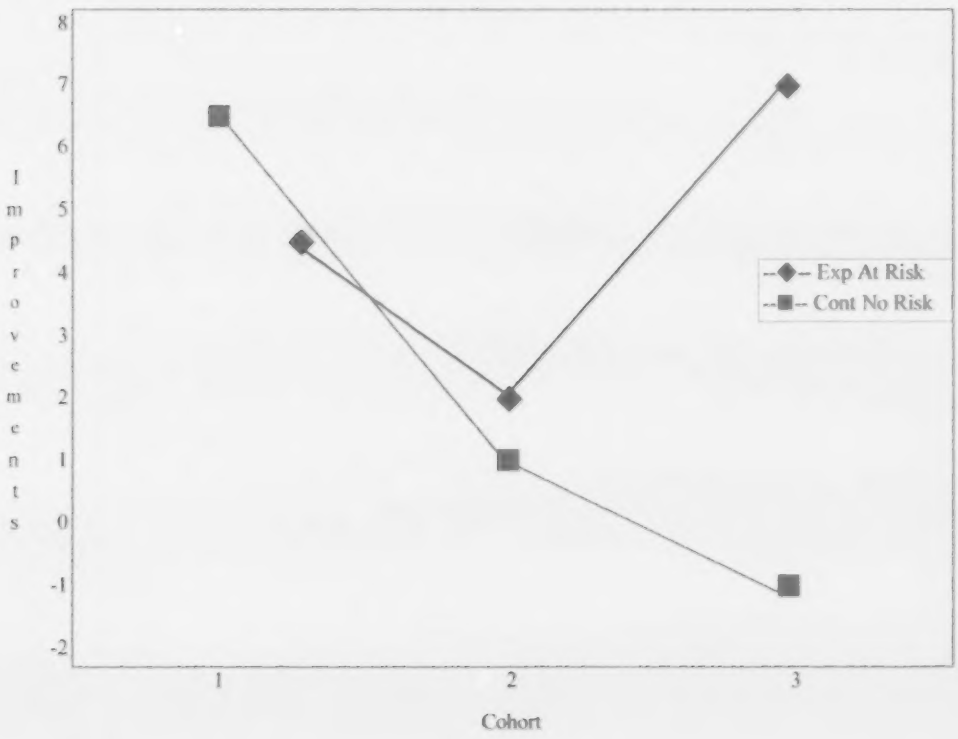


Table 2. 72

Summary Analysis of Variance Table For Reading Scale Score Change

Source	df	SS	MS	F-Statistic	P
Cohort	1	5003.555	2501.777	3.346	.042*
Compare	1	811.706	811.706	1.085	.301
CohortxCompare	2	1009.829	504.194	.675	.520
Error	63	47110.334	747.783		

(p<.05)* (p<.10)**

The RDSS data are displayed in Figure 2. For RDSS, the researcher failed to reject Ho2 & Ho3. However, there was a statistically significant effect for the Cohort groups, F (2,63)=3.346.

Figure 2.

Improvements in Reading Scaled Scores Over Three Years

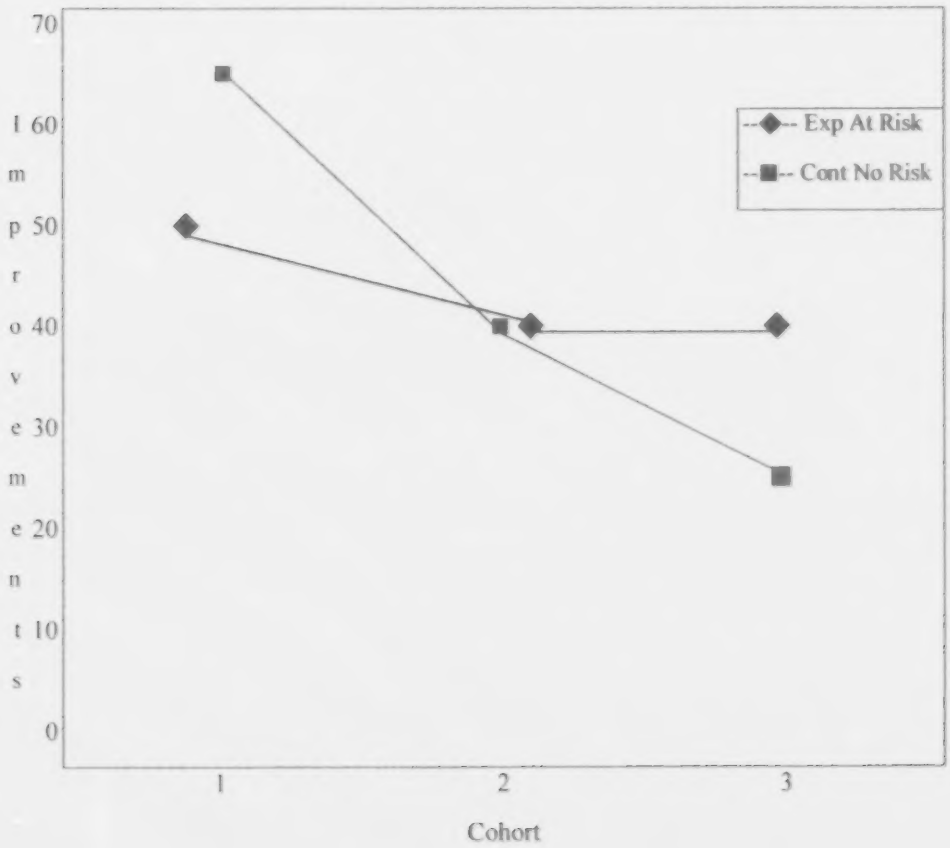


Table 3.

Summary Analysis of Variance Table For Norm Curve Equivalent Total Change

Source	df	SS	MS	F-Statistic	P
Cohort	2	123.710	61.855	.399	.672
Compare	1	432.752	423.752	2.735	.103
CohortxCompare	2	825.658	412.829	2.665	.077**
Error	63	9759.347	154.910		

(p<.05)* (p<.10)**

For NCET, the researcher failed to reject Ho1 & Ho2. However, there was a marginally significant effect between cohortxcompare groups, F (2,63)=2.665.

Figure 3.

Improvements in NCE Total Scores Over Three Years

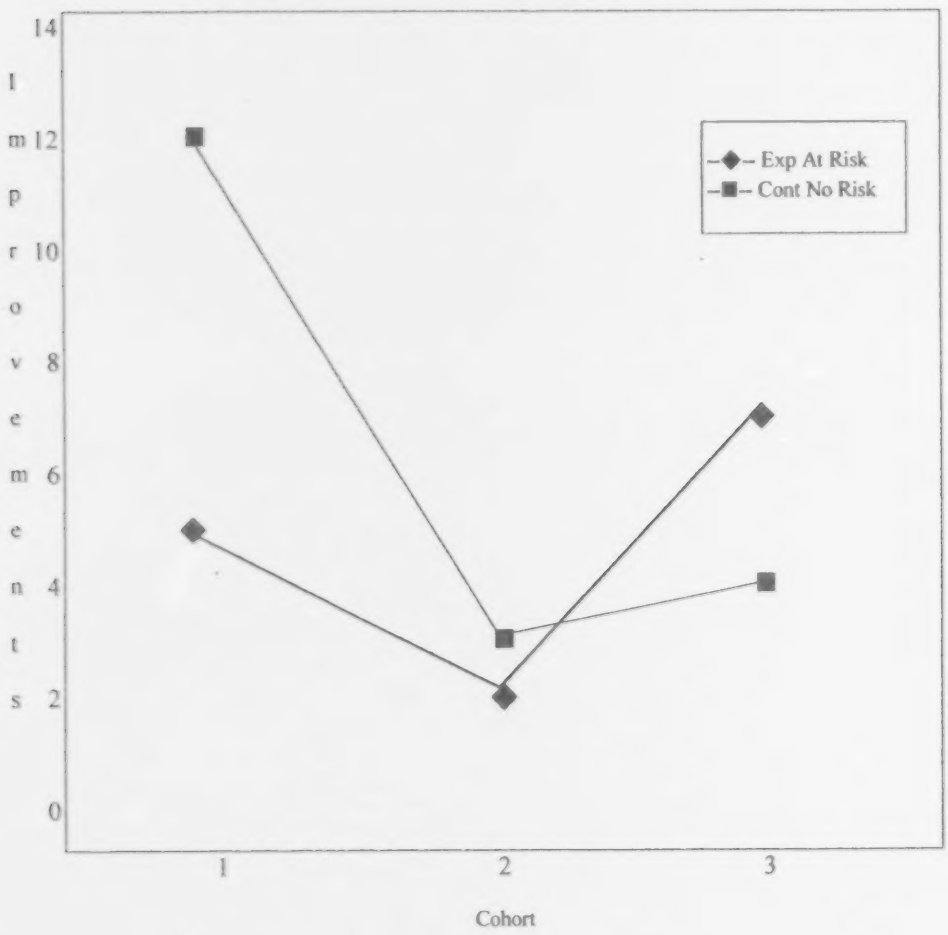


Table 4.

Summary Analysis of Variance Table For Total Scale Score Change

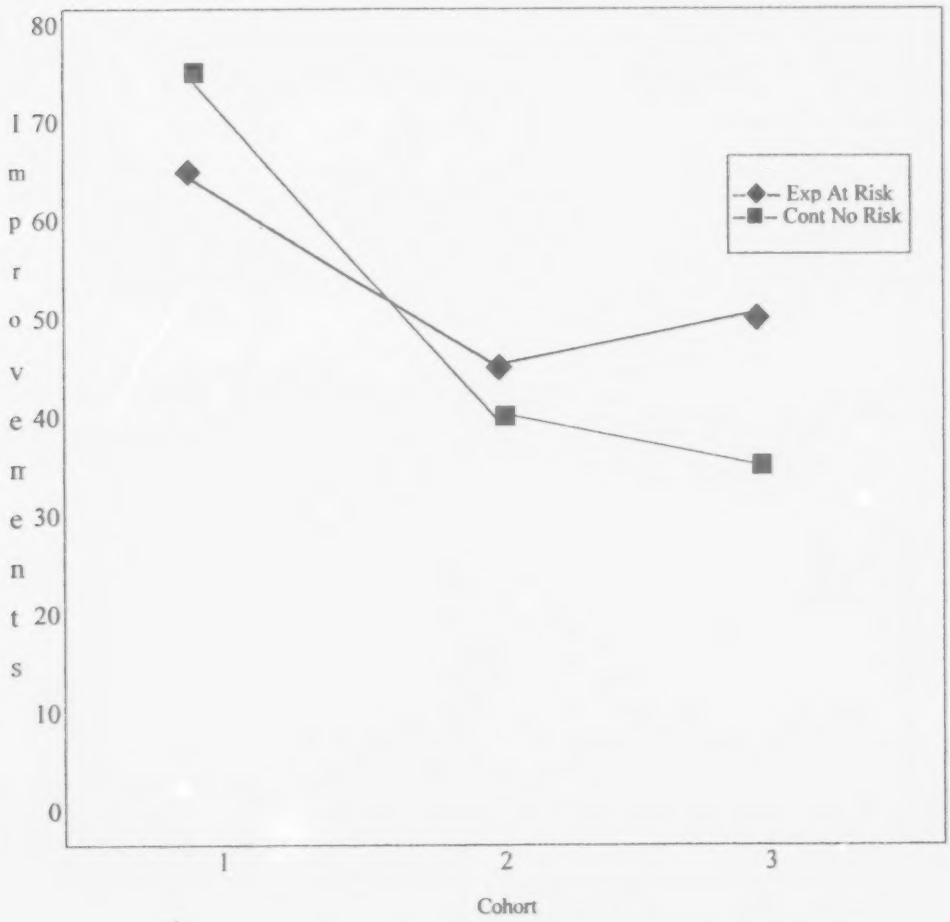
Source	df	SS	MS	F-Statistic	P
Cohort	2	9905.557	4952.779	8.890	.000*
Compare	1	1185.650	1185.650	2.1128	.301
CohortxCompare	2	2479.056	1239.528	2.225	.437
Error	63	35100.093	557.144		

(p<.05)* (p<.10)**

For TTSS, the researcher failed to reject Ho2 & Ho3. However, there was a statistically significant effect of cohort groups, F (2,63)=8.890.

Figure 4.

Improvements in Total Scaled Scores Over Three Years



CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The previous chapters elaborated upon an investigation into the effects of a computer-assisted reading management system, AR, on at-risk students in a selected Title I suburban school district in the metro-east St. Louis, Missouri area. A theoretical basis and rationale for the investigation was presented. This chapter provides a summary of the investigation conducted, conclusions drawn on the basis of the research, and recommendations for further study.

The general purpose of this study was to determine if there was a significant difference between at-risk students who utilized AR in addition to the basal reading program, and those who did not on their CTBS Terra Nova norm-referenced tests. Specifically, changes in scores from the NCE reading, NCE total, reading scale and total scale score portions of the test were examined. The ultimate goal of the study was to determine if there were any improvements or gains in student scores and if AR was an effective supplement to reading instruction for at-risk students.

The subjects of this study were second through sixth grade students at two Title I suburban schools. Subjects from one elementary school, Alpha (the experimental school), were made up of at-risk students who had utilized the AR reading management system in addition to the basal reading program. The subjects from the other elementary school, Beta (the control school), received

their reading instruction through utilization of the basal reading program. The study took place over a three-year span of time from 1997 through 1999.

School district data collected in the study were obtained from archival records for CTBS Terra Nova test score results and from food service department records to determine at-risk status. There were 38 at-risk students from the treatment school (Alpha) and 103 students (31 at-risk and 72 not at-risk) from the control school (Beta). The researcher did not select students who were not at-risk from the experimental school because there were too few.

Conclusions

As shown in chapter 4, in tables 2 and 4 and figures 2 and 4, there was a statistically significant result for reading and total scale scores. The younger students from the first cohort (grades 2, 3, and 4) benefited the most and showed the greatest rate of improvement over time, while the older (grades 4, 5, and 6) students showed the lowest rate of improvement.

The data in table 1 and the illustration in figure 1 indicate that the at-risk students in the third cohort (grades 4, 5, and 6) from the experimental school experienced a marginally significant improvement in their NCE reading scores over time. Thus, the at-risk students in the third cohort (grades 4, 5, and 6) from the experimental school showed the greatest gain or rate of improvement compared to the not at-risk students, beginning at about the fourth grade. This marginally significant result might be attributed to AR, or a combination of AR and a traditional basal reading series.

In addition, the data in table 3 and the illustration in figure 3 show a marginally significant interaction that resulted in greater change or improvement in NCE total scores for the at-risk students from the experimental school. Again, the at-risk students from the experimental school showed a greater gain than the not at-risk cohort. This marginally significant result might also be attributed to AR, or a combination of AR and a traditional basal reading series.

This resulting marginally significant result, although not statistically significant, is unusual because of the small sample size used in the study. In addition, this population of at-risk students achieved gains that would not normally be present without some intervention or treatment. It may be that AR and its combination with the district basal series were responsible for these gains.

These scores were also unusual because, as previously cited by Chall et al. (1990) in their book *The Reading Crisis: Why Poor Children Fall Behind*, in the early primary years, at-risk children were in general on par with mainstream (middle-class) children. However, in this study the early primary children showed statistically significant greater gains. In addition, Chall et al., also noticed a decline at about fourth grade for at-risk children, around age ten, because low-income children could not master the more demanding vocabulary of subject textbooks which require a wider vocabulary.

In stark contrast, the at-risk students from the experimental school did not conform to Chall's (Chall et al, 1990) predicted decline, and instead of showing a decline, they actually showed greater gains in their NCE reading and NCE total scores than the not at-risk students from the control school. Since the only

difference between the two reading programs at both schools was AR, it may be inferred that this accounted for the difference.

Basal Dominated Programs

There are several possible explanations that might account for the unusual finding of the at-risk cohort from the experimental school showing a greater rate of improvement than the not at-risk cohort from the control school. Although both cohorts used the newly adopted district basal series, the students from the control school were in a basal dominated program. These basal programs are often times too literal and skills oriented with very little time actually devoted to reading. When both at-risk and not at-risk students reach the fourth grade, they often confront reading with only the oral language background of their primary years and these oral language abilities are usually less developed in at-risk children. Also, both groups of students were exposed to content area expository reading in science and social studies, in addition to oral language. These are separate subjects requiring different reading strategies than language arts.

Therefore, what could account for the possible improvement of the reading abilities of the at-risk students compared to the not at-risk students? A possible explanation might be that because AR readers were accustomed to reading widely in non-basal readers, increasingly complex narratives did not necessarily discourage them. They may have been less confused than the strictly basal readers from the control school.

Sustained Silent Reading

Although both control and experimental schools used the same newly adopted basal series, only the experimental school used SSR on a daily basis for a minimum of at least 30 minutes a day. This was the part of the AR literature-based system that relied on reading practice. A critical component of SSR and its use with experimental students at Alpha School was that the students in the AR system selected books within their reading level. These were motivating books that they were capable of reading. Perhaps AR and SSR work well together because, as previously cited by Snow et al. (1998), "well-written and engaging texts that include words that children can decipher give them the chance to apply emerging skills with ease and accuracy, thereby teaching themselves new words through their relation to known words" (p.195).

Constructivism, Brain-Based Learning, and ZPD

The idea of at-risk students teaching themselves to read emphasizes the constructivist theory of learning. This theory advocates that the child must construct their own meaning and appears to be inherent in the AR philosophy of reading instruction. The process of patterning and creating a relation of new words to known words was probably enhanced for not at-risk students by their parents when they read to them during their pre-school years, a practice that may be less common in at-risk homes. Caine and Caine (1991) referred to this idea of creating patterns when they explained how the brain learns. They stated reading practice involves creating and revising patterns of information.

In order to ensure that students comprehended the story, all AR students at Alpha School were tested and the reading management system software stored their scores. If they were not scoring well on their tests and succeeding within their ZPD, the teachers at Alpha School examined the students' daily reading logs and moved the students up or down to find their correct reading level to ensure that the students succeeded and were challenged. This computer-assisted literal test was a more motivating and fun-oriented task for students than writing traditional book reports, which are time consuming.

Motivation and Word Recognition

A motivated reader within his or her ZPD range who practices reading may become more adept at word recognition. Since the human mind is limited in terms of the amount of information it can store, the at-risk students at Alpha School, through the practice of reading, may have been able to become more adept at word recognition and were consequently able to concentrate most of their processing space on comprehension, rather than merely trying to identify a word. As a result, practice reading allowed the at-risk students to bring information they had already acquired on a topic and use it to facilitate text processing, comprehension, and recall. At-risk students were motivated to do this by the use of extrinsic rewards and intrinsic goal setting. Thus, the majority of at-risk students at Alpha School may have been lacking motivation and experience in identifying words, and not necessarily an inherent lack of ability.

Vocabulary Development and Independent Reading

The number one priority at Alpha School was establishing independent reading within the context of the AR system and its various components of practice and teacher intervention. Independent reading is the cornerstone of AR because it allows students to acquire background knowledge, or schema, to help them to analyze and monitor their own strategies for comprehension, within as Vygotsky described, their own "zones of proximal development."

As previously cited by Chall et al. (1990), it is very important that at-risk students engage in wide reading to develop fluency and automaticity. In addition, Anderson and Nagy (1991) stated that students must engage in significant amounts of independent reading in order to develop a sufficiently large vocabulary. Also, as previously cited by Becker (1997), one of the most important literacy skills for disadvantaged students is vocabulary acquisition because it is crucial to their academic development. Indeed, Adams (1990) stated that the only chance students with poor vocabularies have to catch up to their peers is by extraordinary amounts of independent reading.

Combination of AR and Basals

Another important conclusion from this study is that at-risk students can benefit from using AR as a supplemental reading component when it is used in conjunction with a traditional basal reading program. It is important to note that the AR approach was not used alone at Alpha School, but in conjunction with the newly adopted district basal series. Research has shown that no one approach should be used for all students, and according to the Bond and Dykstra (1967)

study, the teacher's expertise at carrying out the approach seemed to determine how well that method worked. This would seem to be especially true for the at-risk students at Alpha School. One reason AR succeeded at Alpha School may have been because of the commitment of the instructional staff and Title I committee. They worked hard to implement and sustain it properly, and may have felt a sense of ownership and pride in seeing it succeed.

For at-risk students, this final explanation is perhaps the simplest, but the most profound. Basal reading instruction used alone to teach at-risk students may not meet their needs because it relies on past instructional practices, traditional textbook basals, and arbitrary units of time. Teaching reading as a sequencing of skills within a set time frame ignores the fact that many students may need various instructional strategies and tactics to address their individual learning styles. It does not take into regard how children, especially at-risk children, actually learn. Whereas, AR, through its use of the ZPD, ensures that students are learning to read and processing text within their developmentally appropriate range. In addition, AR allows the students to proceed at their own pace instead of imposing time limits.

Recommendations for Further Study

Primary Reading Instruction, School Size, and the Use of Basals

This study included an examination of reading from second through sixth grade. Further studies should be initiated that analyze how instruction could be maximized for at-risk students in the primary grades. Students need to learn how to read before they can read to learn. Therefore, instructional methods need to be

examined that combine the accountability and individualized nature of learning to read embodied in AR with effective textbook practices for classroom instruction in beginning to read.

Another area for future study is to ascertain whether AR could be implemented in a much larger school, or in a non-Title I school with fewer resources. Also, another study that utilized only AR without a basal as the primary source of reading instruction as opposed to a school that only uses a textbook basal series could be beneficial.

Time, Resources and Staff Development

Further studies should focus on how to restructure the school day so that at-risk students can receive the amount of instructional time necessary to meet their developmental needs in reading instruction, especially in the primary grades. In addition, an analysis of the most effective means of allocating resources to meet this goal is absolutely essential.

However, more important than resource allocation or time management is staff development. Further studies should focus on staff development for at-risk reading instruction, from a more holistic, systematic prospective. Teachers need to learn how to use their time and resources in an effective manner, without relying solely on basals. Teachers need to learn more about what works for at-risk students and administrators need to coordinate that change throughout the school district.

Convergence Rather Than Divergence

Perhaps the underlying focus of further studies should be to adopt a more enlightened perspective by seeking out convergent rather than divergent methods of reading instruction. A truce should be declared in the "reading wars." Instead of trying to compare how students perform using variance and reliability, research should focus on why students have problems and not students' differences. Research should identify realistic and meaningful standards that will allow students to realize their educational potential. In other words, research in reading should focus on making recommendations based on applied science principles and emphasizing what works and why.

In conclusion, future research in reading instruction for at-risk students must overcome an entrenched educational bureaucracy and instructional methods that are enculturated and do not match research and best practices. Perhaps the very educational system that professes to find answers for helping at-risk students to learn to read may be one of the greatest obstacles in the way.

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VITA AUCTORIS

Virgil Norman Kambarian, Jr, son of Virgil and Anna Mae Kambarian, was born September 7, 1946 in Granite City, Illinois. His immigrant paternal grandparents, Abraham and Herminie Kambarian raised him from a child. He graduated from public school in Granite City, Illinois in 1965. He received an honorable discharge from the United States Marine Corps in 1967. He attended Eastern Illinois University where he received the Bachelor of Science in Education degree in 1971. While at Eastern Illinois University his peers elected him as a student in the 1971 edition of *Who's Who in American Colleges and Universities*. He married Lois Kambarian, a special education teacher, and he has a son Erik, who is a naval midshipman, and a daughter Kristin, who is a middle school student.

For the first 24 years of his professional career, he was a public school teacher and coach in Granite City and Piasa, Illinois, and in the Riverview Gardens School District in St. Louis, Missouri. In 1996, he received the Master of Science in Educational Administration degree from Southern Illinois University at Edwardsville.

He was the assistant principal (intern) of Prather Elementary School in 1995, and the principal of Marshall Elementary School in 1996. He became the principal of Lake Elementary School in 2000, and he aspires to be a superintendent. He is a member of Phi Kappa Phi, Kappa Delta Pi, Phi Alpha Theta, Pi Sigma Alpha and Phi Delta Kappa.